# NATEF Maintenance and Light Repair Task List Correlation Chart

The following chart correlates the *Modern Automotive Technology* textbook (©2017) to the 2013 NATEF Maintenance and Light Repair Task List.

### **ENGINE REPAIR**

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

Task Number and Description	Priority	Page #s
I. ENGINE REPAIR		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114
service history, service precautions, and technical service		
bulletins.		
2. Verify operation of the instrument panel engine warning	P-1	302–307, 381–390,
indicators.		399–411, 415–428,
		620–623, 1003–
		1020
3. Inspect engine assembly for fuel, oil, coolant, and other	P-1	302–307, 381–390,
leaks; determine necessary action.		399–411, 415–428,
		620–623, 1003–
		1020
4. Install engine covers using gaskets, seals, and sealers as	P-1	137, 141–146, 150–
required.		151, 705–716, 735,
		745, 755, 764, 766,
		860-865, 873-877,
		879, 912–920,
		1028, 1289, 1325–
		1328, 1333
5. Remove and replace timing belt; verify correct camshaft	P-1	1179–1182
timing.		
6. Perform common fastener and thread repair, to include:	P-1	1183–1189
remove broken bolt, restore internal and external threads, and		
repair internal threads with thread insert.		
7. Identify hybrid vehicle internal combustion engine service	P-3	82, 454–458
precautions.		

Task Number and Description	Priority	Page #s
I. ENGINE REPAIR		
B. Cylinder Head and Valve Train		
1. Adjust valves (mechanical or hydraulic lifters).	P-1	1170
I. ENGINE REPAIR		
C. Lubrication and Cooling Systems		
1. Perform cooling system pressure and dye tests to identify	P-1	863-865, 875, 884,
leaks; check coolant condition and level; inspect and test		888-889
radiator, pressure cap, coolant recovery tank, and heater core		
and galley plugs; determine necessary action.		
2. Inspect, replace, and adjust drive belts, tensioners, and	P-1	1188
pulleys; check pulley and belt alignment.		
3. Remove, inspect, and replace thermostat and gasket/seal.	P-1	870-873
4. Inspect and test coolant; drain and recover coolant; flush and	P-1	879-882, 884
refill cooling system with recommended coolant; bleed air as		
required.		
5. Perform engine oil and filter change.	P-1	138–141

## AUTOMATIC TRANSMISSION AND TRANSAXLE

For every task in Automatic Transmission and Transaxle, the following safety requirement must be strictly enforced:

Task Number and Description	Priority	Page #s
II. AUTOMATIC TRANSMISSION AND TRANSAXLE		
A. General		
1. Research applicable vehicle and service information, fluid	P-1	138
type, vehicle service history, service precautions, and technical		
service bulletins.		
2. Check fluid level in a transmission or a transaxle equipped	P-1	141–142
with a dipstick.		
3. Check fluid level in a transmission or a transaxle not	P-1	142
equipped with a dipstick.		
4. Check transmission fluid condition; check for leaks.	P-2	141–142, 1327–
		1328, 1331–1333

Task Number and Description	Priority	Page #s
II. AUTOMATIC TRANSMISSION AND TRANSAXLE		
B. In-Vehicle Transmission/Transaxle		
1. Inspect, adjust, and replace external manual valve shift	P-2	1333–1334
linkage, transmission range sensor/switch, and park/neutral		
position switch.		
2. Inspect for leakage at external seals, gaskets, and bushings.	P-2	129–133, 138, 141–
		142, 1327–1328,
		1331–1333, 1439
3. Inspect, replace, and align power train mounts.	P-2	1290–1295, 1358–
		1359, 1438
4. Drain and replace fluid and filter(s).	P-1	138, 141–142,
		1327–1328, 1331–
		1333
II. AUTOMATIC TRANSMISSION AND TRANSAXLE		
C. Off-Vehicle Transmission and Transaxle		
1. Describe the operational characteristics of a continuously	P-3	1416
variable transmission (CVT).		
2. Describe the operational characteristics of a hybrid vehicle drive	P-3	437-438, 443-449
train.		

## MANUAL DRIVE TRAIN AND AXLES

For every task in Manual Drive Train and Axles, 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	Page #s
III. MANUAL DRIVE TRAIN AND AXLES		
A. General		
1. Research applicable vehicle and service information, fluid	P-1	1289, 1293, 1394
type, vehicle service history, service precautions, and technical		
service bulletins.		
2. Drain and refill manual transmission/transaxle and final drive	P-1	1269, 1430
unit.		
3. Check fluid condition; check for leaks.	P-2	143–144
III. MANUAL DRIVE TRAIN AND AXLES		
B. Clutch		
1. Check and adjust clutch master cylinder fluid level.	P-1	145
2. Check for system leaks.	P-1	145

Task Number and Description	Priority	Page #s
III. MANUAL DRIVE TRAIN AND AXLES		
C. Transmission/Transaxle		
1. Describe the operational characteristics of an electronically-	P-3	1280, 1282
controlled manual transmission/transaxle.		
III. MANUAL DRIVE TRAIN AND AXLES		
D. Drive Shaft, Half Shafts, Universal and Constant-Velocity	(CV) Joints	
1. Inspect, remove, and replace front-wheel drive (FWD)	P-2	1392
bearings, hubs, and seals.		
2. Inspect, service, and replace shafts, yokes, boots, and	P-2	1360–1362
universal/CV joints.		
III. MANUAL DRIVE TRAIN AND AXLES		
E. Differential Case Assembly		
1. Clean and inspect differential housing; check for leaks;	P-2	1390
inspect housing vent.		
2. Check and adjust differential housing fluid level.	P-1	143–144, 1390
3. Drain and refill differential housing.	P-1	144, 1390
E.1 Drive Axles		
1. Inspect and replace drive axle wheel studs.	P-2	1392, 1394
III. MANUAL DRIVE TRAIN AND AXLES		
F. Four-wheel Drive/All-wheel Drive		
1. Inspect front-wheel bearings and locking hubs.	P-3	1470–1471, 1480–
		1484
2. Check for leaks at drive assembly seals; check vents; check	P-2	143, 147, 1360
lube level.		

#### **SUSPENSION AND STEERING**

For every task in Suspension and Steering, the following safety requirement must be strictly enforced:

Task Number and Description	Priority	Page #s
IV. SUSPENSION AND STEERING SYSTEMS		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114, 1568,
service history, service precautions, and technical service		1747
bulletins.		
2. Disable and enable supplemental restraint system (SRS).	P-1	1747–1748

Task Number and Description	Priority	Page #s
IV. SUSPENSION AND STEERING		
B. Related Suspension and Steering Service		
1. Inspect rack and pinion steering gear inner tie-rod ends	P-1	1566
(sockets) and bellows boots.		
2. Determine proper power steering fluid type; inspect fluid	P-1	144, 1563
level and condition.		
3. Flush, fill, and bleed power steering system.	P-2	1571
4. Inspect for power steering fluid leakage; determine necessary	P-1	1563
action.		
5. Remove, inspect, replace, and adjust power steering pump	P-1	1564
drive belt.		
6. Inspect and replace power steering hoses and fittings.	P-2	1542–1543
7. Inspect pitman arm, relay (centerlink/intermediate) rod, idler	P-1	1542, 1565–1566
arm and mountings, and steering linkage damper.		
8. Inspect tie-rod ends (sockets), tie-rod sleeves, and clamps.	P-1	1566
9. Inspect upper and lower control arms, bushings, and shafts.	P-1	1522–1524
10. Inspect and replace rebound and jounce bumpers.	P-1	
11. Inspect track bar, strut rods/radius arms, and related mounts	P-1	1522–1524
and bushings.		
12. Inspect upper and lower ball joints (with or without wear	P-1	1519–1520
indicators).		
13. Inspect suspension system coil springs and spring insulators	P-1	1517
(silencers).		
14. Inspect suspension system torsion bars and mounts.	P-1	1519
15. Inspect and replace front stabilizer bar (sway bar) bushings,	P-1	1499
brackets, and links.		
16. Inspect strut cartridge or assembly.	P-1	
17. Inspect front strut bearing and mount.	P-1	
18. Inspect rear suspension system lateral links/arms (track	P-1	1522–1524
bars), control (trailing) arms.		
19. Inspect rear suspension system leaf spring(s), spring	P-1	1518
insulators (silencers), shackles, brackets, bushings, center		
pins/bolts, and mounts.		
20. Inspect, remove, and replace shock absorbers; inspect	P-1	1514–1516
mounts and bushings.		
21. Inspect electric power-assisted steering.	P-3	1574
22. Identify hybrid vehicle power steering system electrical	P-2	—
circuits and safety precautions.		
23. Describe the function of the power steering pressure switch.	P-3	

Task Number and Description	Priority	Page #s
IV. SUSPENSION AND STEERING		· · ·
C. Wheel Alignment		
1. Perform prealignment inspection and measure vehicle ride	P-1	1585–1589
height; determine necessary action.		
IV. SUSPENSION AND STEERING		
D. Wheels and Tires		
1. Inspect tire condition; identify tire wear patterns; check for	P-1	1449–1455, 1467–
correct size and application (load and speed ratings) and adjust		1470, 1472
air pressure; determine necessary action.		
2. Rotate tires according to manufacturer's recommendations.	P-1	1472
3. Dismount, inspect, and remount tire on wheel; balance wheel	P-1	1474–1478
and tire assembly (static and dynamic).		
4. Dismount, inspect, and remount tire on wheel equipped with	P-2	1479
tire pressure monitoring system sensor.		
5. Inspect tire and wheel assembly for air loss; perform	P-1	1478
necessary action.		
6. Repair tire using internal patch.	P-1	1478
7. Identify and test tire pressure monitoring systems (indirect	P-2	1479–1480
and direct) for operation; verify operation of instrument panel		
lamps.		
8. Demonstrate knowledge of steps required to remove and	P-2	1479–1480
replace sensors in a tire pressure monitoring system.		

#### **BRAKES**

For every task in Brakes, the following safety requirement must be strictly enforced:

Task Number and Description	Priority	Page #s
V. BRAKES		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114
service history, service precautions, and technical service		
bulletins.		
2. Describe procedure for performing a road test to check brake	P-1	1625, 1669
system operation, including an anti-lock brake system (ABS).		
3. Install wheel and torque lug nuts.	P-1	1473

Task Number and Description	Priority	Page #s
V. BRAKES		
B. Hydraulic System		
1. Measure brake pedal height, travel, and free play (as	P-1	1628
applicable); determine necessary action.		
2. Check master cylinder for external leaks and proper	P-1	1631
operation.		
3. Inspect brake lines, flexible hoses, and fittings for leaks,	P-1	1628–1630
dents, kinks, rust, cracks, bulging, wear, loose fittings and		
supports; determine necessary action.		
4. Select, handle, store, and fill brake fluids to proper level.	P-1	1628–1629
5. Identify components of brake warning light system.	P-3	1627
6. Bleed and/or flush brake system.	P-1	1631–1634
7. Test brake fluid for contamination.	P-1	145, 1628–1629
V. BRAKES		
C. Drum Brakes		
1. Remove, clean, inspect, and measure brake drum diameter;	P-1	1643
determine necessary action.		
2. Refinish brake drum and measure final drum diameter;	P-1	1643–1645
compare with specifications.		
3. Remove, clean, and inspect brake shoes, springs, pins, clips,	P-1	1645–1648
levers, adjusters/self-adjusters, other related brake hardware,		
and backing support plates; lubricate and reassemble.		
4. Inspect wheel cylinders for leaks and proper operation;	P-2	1643
remove and replace as needed.		
5. Pre-adjust brake shoes and parking brake; install brake drums	P-2	1648–1649
or drum/hub assemblies and wheel bearings; make final checks		
and adjustments.		
V. BRAKES		
D. Disc Brakes		
1. Remove and clean caliper assembly; inspect for leaks and	P-1	1637–1638
damage/wear to caliper housing; determine necessary action.		
2. Clean and inspect caliper mounting and slides/pins for proper	P-1	
operation, wear, and damage; determine necessary action.		
3. Remove, inspect, and replace pads and retaining hardware;	P-1	1629, 1634, 1636
determine necessary action.		
4. Lubricate and reinstall caliper, pads, and related hardware;	P-1	1629, 1634, 1636
seat pads and inspect for leaks.		
5. Clean and inspect rotor, measure rotor thickness, thickness	P-1	1637–1638
variation, and lateral runout; determine necessary action.		
6. Remove and reinstall rotor.	P-1	1638–1642

Task Number and Description	Priority	Page #s
7. Refinish rotor on vehicle; measure final rotor thickness and	P-1	1641–1642
compare with specifications.		
8. Refinish rotor off vehicle; measure final rotor thickness and	P-1	1640–1641
compare with specifications.		
9. Retract and readjust caliper piston on an integral parking	P-3	1639–1640
brake system.		
10. Check brake pad wear indicator; determine necessary	P-2	_
action.		
11. Describe importance of operating vehicle to burnish/break-	P-1	1636
in replacement brake pads according to manufacturer's		
recommendations.		
V. BRAKES		
E. Power-Assist Units		
1. Check brake pedal travel with and without engine running to	P-2	1628
verify proper power booster operation.		
2. Check vacuum supply (manifold or auxiliary pump) to	P-1	1630
vacuum-type power booster.		
V. BRAKES		
F. Miscellaneous (Wheel Bearings, Parking Brakes, Electrical	l, Etc.)	
1. Remove, clean, inspect, repack, and install wheel bearings;	P-1	1480, 1482–1483
replace seals; install hub and adjust bearings.		
2. Check parking brake cables and components for wear,	P-2	1629, 1649
binding, and corrosion; clean, lubricate, adjust, or replace as		
needed.		
3. Check parking brake operation and parking brake indicator	P-1	1629, 1649
light system operation; determine necessary action.		
4. Check operation of brake stop light system.	P-1	1480–1483
5. Replace wheel bearing and race.	P-2	1484
6. Inspect and replace wheel studs.	P-1	1392, 1394
V. BRAKES		
G. Electronic Brakes, and Traction and Stability Control Syst	tems	
1. Identify traction control/vehicle stability control system	P-3	1660–1661
components.		
2. Describe the operation of a regenerative braking system.	P-3	24, 442, 1666–1667

## **ELECTRICAL/ELECTRONIC SYSTEMS**

For every task in Electrical/Electronic Systems, 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	Page #s
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114
service history, service precautions, and technical service		
bulletins.		
2. Demonstrate knowledge of electrical/electronic series,	P-1	266–268
parallel, and series-parallel circuits using principles of		
electricity (Ohm's Law).		
3. Use wiring diagrams to trace electrical/electronic circuits.	P-1	327–342, 1716–
		1718
4. Demonstrate proper use of a digital multimeter (DMM) when	P-1	305, 355–362
measuring source voltage, voltage drop (including grounds),		
current flow, and resistance.		
5. Demonstrate knowledge of the causes and effects from	P-2	349–352
shorts, grounds, opens, and resistance problems in		
electrical/electronic circuits.		
6. Check operation of electrical circuits with a test light.	P-2	353–354
7. Check operation of electrical circuits with fused jumper	P-2	352–353
wires.		
8. Measure key-off battery drain (parasitic draw).	P-1	494
9. Inspect and test fusible links, circuit breakers, and fuses;	P-1	283–284, 326–327,
determine necessary action.		365
10. Perform solder repair of electrical wiring.	P-1	319–320
11. Replace electrical connectors and terminal ends.	P-1	324–325
VI. ELECTRICAL/ELECTRONIC SYSTEMS		·
B. Battery Service		
1. Perform battery state-of-charge test; determine necessary	P-1	492
action.		
2. Confirm proper battery capacity for vehicle application;	P-1	497–498
perform battery capacity test; determine necessary action.		
3. Maintain or restore electronic memory functions.	P-1	425
4. Inspect and clean battery; fill battery cells; check battery	P-1	499, 527–528
cables, connectors, clamps, and hold-downs.		

5. Perform slow/fast battery charge according to manufacturer's recommendations.  P-1  494    6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.  P-1  496–497    7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.  P-3  438, 454–458, 499–    8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.  P-3  —    9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  P-3  —    VI. ELECTRICAL/ELECTRONIC SYSTEMS  C. Starting System  —    1. Perform starter current draw test; determine necessary action.  P-1  525–526    2. Perform starter relays and solenoids; determine necessary action.  P-1  526–527    3. Inspect and test starter relays and solenoids; determine necessary action.  P-1  530, 532    4. Remove and install starter in a vehicle.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of st
6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.  P-1  496–497    7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.  P-3  438, 454–458, 499–506    8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.  P-1  —    9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  P-3  —    VI. ELECTRICAL/ELECTRONIC SYSTEMS    C. Starting System  P-1  525–526    2. Perform starter current draw test; determine necessary action.  P-1  526–527    action.  S1  S28–529    actessary action.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of starter  P-2  528–529    control circuits; determine necessary action.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of starter  P-2  529–530    control circuits; determine necessary action.  P-1  530, 532    7. Inspect and test switches, connectors, and wires of starter  P-2  529–530    control circuits; determine necessary action.  P-1  530, 532
or an auxiliary power supply.7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.P-3438, 454–458, 499– 5068. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.P-1—9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.P-3—VI. ELECTRICAL/ELECTRONIC SYSTEMS C. Starting System1. Perform starter current draw test; determine necessary action.P-1525–5262. Perform starter circuit voltage drop tests; determine necessary action.P-1526–5273. Inspect and test starter relays and solenoids; determine necessary action.P-2528–5294. Remove and install starter in a vehicle.P-1530, 5325. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.P-1530, 532VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging SystemP-1553–5581. Perform charging system output test; determine necessary action.P-1530, 5325. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.  P-3  438, 454–458, 499–506    8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.  P-1  —    9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  P-3  —    VI. ELECTRICAL/ELECTRONIC SYSTEMS
vehicle and related safety precautions.5068. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.P-1—9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.P-3— <b>VI. ELECTRICAL/ELECTRONIC SYSTEMS</b> <b>C. Starting System</b> P-1525–5262. Perform starter current draw test; determine necessary action.P-1526–5273. Inspect and test starter relays and solenoids; determine necessary action.P-2528–5294. Remove and install starter in a vehicle.P-1530, 5325. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.P-1530, 532 <b>VI. ELECTRICAL/ELECTRONIC SYSTEMS</b> <b>D. Charging SystemP</b> -1553–5581. Perform charging system output test; determine necessary action.P-1553–5582. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.  P-1  —    9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  P-3  —    VI. ELECTRICAL/ELECTRONIC SYSTEMS C. Starting System  VI.  525–526    2. Perform starter current draw test; determine necessary action.  P-1  525–526    2. Perform starter circuit voltage drop tests; determine necessary action.  P-1  526–527    3. Inspect and test starter relays and solenoids; determine necessary action.  P-2  528–529    4. Remove and install starter in a vehicle.  P-1  530, 532    5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.  P-2  529–530    VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging System  VI  ELECTRICAL/ELECTRONIC SYSTEMS D. Charging system output test; determine necessary action.  P-1  530, 532    3. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.  P-1  533–558    0. Charging System  II  Perform charging system output test; determine necessary action.  P-1  553–558    2. Inspect, adjust, or replace generator (alternator) drive belts
other accessories that require reinitialization or code entry after reconnecting vehicle battery.P-39. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.P-3VI. ELECTRICAL/ELECTRONIC SYSTEMS C. Starting System1. Perform starter current draw test; determine necessary action.P-1525–5262. Perform starter current draw test; determine necessary action.P-1526–5273. Inspect and test starter relays and solenoids; determine necessary action.P-2528–5294. Remove and install starter in a vehicle.P-1530, 5325. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.P-1530, 532VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging SystemVI.P-1553–5581. Perform charging system output test; determine necessary action.P-1553–5582. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
reconnecting vehicle battery.P-39. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.P-3VI. ELECTRICAL/ELECTRONIC SYSTEMS C. Starting System1. Perform starter current draw test; determine necessary action.P-1525–5262. Perform starter circuit voltage drop tests; determine necessary action.P-1526–5273. Inspect and test starter relays and solenoids; determine necessary action.P-2528–5294. Remove and install starter in a vehicle.P-1530, 5325. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.P-2529–530VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging System1. Perform charging system output test; determine necessary action.P-1533, 5325. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–558, 558–559
9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  P-3  —    VI. ELECTRICAL/ELECTRONIC SYSTEMS    C. Starting System    1. Perform starter current draw test; determine necessary action.  P-1  525–526    2. Perform starter circuit voltage drop tests; determine necessary action.  P-1  526–527    action.  3. Inspect and test starter relays and solenoids; determine necessary action.  P-1  530, 532    4. Remove and install starter in a vehicle.  P-1  530, 532  5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.  P-2  529–530    VI. ELECTRICAL/ELECTRONIC SYSTEMS    D. Charging System    P-1  530, 532    S. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.    VI. ELECTRICAL/ELECTRONIC SYSTEMS    D. Charging System    1. Perform charging system output test; determine necessary action.  P-1  553–558    2. Inspect, adjust, or replace generator (alternator) drive belts;  P-1  552–553, 558–559
and test procedures.Image: Constraint of the system output test; determine necessary action.P-1525–5261. Perform starter current draw test; determine necessary action.P-1525–5262. Perform starter circuit voltage drop tests; determine necessary action.P-1526–5273. Inspect and test starter relays and solenoids; determine necessary action.P-2528–5294. Remove and install starter in a vehicle.P-1530, 5325. Inspect and test switches, connectors, and wires of starter relays and solenoids; determine necessary action.P-2529–530VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging System1. Perform charging system output test; determine necessary action.P-1553–5582. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
VI. ELECTRICAL/ELECTRONIC SYSTEMSC. Starting System1. Perform starter current draw test; determine necessary action.2. Perform starter circuit voltage drop tests; determine necessary action.3. Inspect and test starter relays and solenoids; determine necessary action.4. Remove and install starter in a vehicle.5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.VI. ELECTRICAL/ELECTRONIC SYSTEMS D. Charging System1. Perform charging system output test; determine necessary action.2. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
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1. Perform charging system output test; determine necessary action.P-1553–5582. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
action. 2. Inspect, adjust, or replace generator (alternator) drive belts; P-1 552–553, 558–559
2. Inspect, adjust, or replace generator (alternator) drive belts;P-1552–553, 558–559
check pulleys and tensioners for wear; check pulley and belt
alignment.
3. Remove, inspect, and reinstall generator (alternator).P-2558–559
4. Perform charging circuit voltage drop tests; determineP-1526–527
necessary action.
VI. ELECTRICAL/ELECTRONIC SYSTEMS
E. Lighting Systems
1. Inspect interior and exterior lamps and sockets includingP-1613–616
headlights and auxiliary lights (fog lights/driving lights);
replace as needed.
2. Aim headlights. P-2 616–617
3. Identify system voltage and safety precautions associatedP-2607, 615
with high-intensity discharge headlights.

Task Number and Description	P	age #s
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
F. Accessories		
1. Disable and enable air bag system for vehicle service; verify	P-1	1743, 1745–1746
indicator lamp operation.		
2. Remove and reinstall door panel.	P-1	649
3. Describe the operation of keyless entry/remote-start systems.	P-3	665–666
4. Verify operation of instrument panel gauges and	P-1	882-883
warning/indicator lights; reset maintenance indicators.		
5. Verify windshield wiper and washer operation; replace wiper	P-1	630
blades.		

## HEATING AND AIR CONDITIONING

For every task in Heating and Air Conditioning, 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	Page #s
VII. HEATING AND AIR CONDITIONING		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114
service history, service precautions, and technical service		
bulletins.		
VII. HEATING AND AIR CONDITIONING		
B. Refrigeration System Components		
1. Inspect and replace A/C compressor drive belts, pulleys, and	P-1	1709–1710
tensioners; determine necessary action.		
2. Identify hybrid vehicle A/C system electrical circuits and the	P-2	462
service/safety precautions.		
3. Inspect A/C condenser for airflow restrictions; determine	P-1	1710
necessary action.		
VII. HEATING AND AIR CONDITIONING		
C. Heating, Ventilation, and Engine Cooling Systems		
1. Inspect engine cooling and heater system hoses; perform	P-1	1710, 1714
necessary action.		
VII. HEATING AND AIR CONDITIONING		
D. Operating Systems and Related Controls		
1. Inspect A/C-heater ducts, doors, hoses, cabin filters, and	P-1	
outlets; perform necessary action.		
2. Identify the source of A/C system odors.	P-2	1708

### **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	Page #s
VIII. ENGINE PERFORMANCE		
A. General		
1. Research applicable vehicle and service information, vehicle	P-1	109–114, 989–990
service history, service precautions, and technical service		
bulletins.		
2. Perform engine absolute (vacuum/boost) manifold pressure	P-1	997, 1034
tests; determine necessary action.		
3. Perform cylinder power balance test; determine necessary	P-2	1034–1035
action.		
4. Perform cylinder cranking and running compression tests;	P-1	1029–1034, 1055–
determine necessary action.		1056
5. Perform cylinder leakage test; determine necessary action.	P-1	1034
6. Verify engine operating temperature.	P-1	837-838
7. Remove and replace spark plugs; inspect secondary ignition	P-1	586–591
components for wear and damage.		
VIII. ENGINE PERFORMANCE		
B. Computerized Controls		
1. Retrieve and record diagnostic trouble codes, OBD monitor	P-1	403-411, 415-416,
status, and freeze-frame data; clear codes when applicable.		994
2. Describe the importance of operating all OBD II monitors	P-1	400, 747–748, 952–
for repair verification.		953
VIII. ENGINE PERFORMANCE		
C. Fuel, Air Induction, and Exhaust Systems		
1. Replace fuel filter(s).	P-1	701
2. Inspect, service, or replace air filters, filter housings, and	P-1	715–716, 1051
intake ductwork.		
3. Inspect integrity of the exhaust manifold, exhaust pipes,	P-1	801-802, 1051
muffler(s), catalytic converter(s), resonator(s), tailpipe(s), and		
heat shields; determine necessary action.		
4. Inspect condition of exhaust system hangers, brackets,	P-1	801-805
clamps, and heat shields; repair or replace as needed.		
5. Check and refill diesel exhaust fluid (DEF).	P-3	
VIII. ENGINE PERFORMANCE		
D. Emissions Control Systems		

Task Number and Description	Priority	Page #s
1. Inspect, test, and service positive crankcase ventilation	P-2	968–969, 971–972
(PCV) filter/breather cap, valve, tubes, orifices, and hoses;		
perform necessary action.		

# **REQUIRED SUPPLEMENTAL TASKS**

Task Number and Description	Page #s
Shop and Personal Safety	
1. Identify general shop safety rules and procedures.	83-84
2. Utilize safe procedures for handling of tools and equipment.	77, 83
3. Identify and use proper placement of floor jacks and jack	84
stands.	
4. Identify and use proper procedures for safe lift operation.	76–77
5. Utilize proper ventilation procedures for working within the	81
lab/shop area.	
6. Identify marked safety areas.	78
7. Identify the location and the types of fire extinguishers and	79–80
other fire safety equipment; demonstrate knowledge of the	
procedures for using fire extinguishers and other fire safety	
equipment.	
8. Identify the location and use of eyewash stations.	83
9. Identify the location of the posted evacuation routes.	78
10. Comply with the required use of safety glasses, ear	83
protection, gloves, and shoes during lab/shop activities.	
11. Identify and wear appropriate clothing for lab/shop	83
activities.	
12. Secure hair and jewelry for lab/shop activities.	83
13. Demonstrate awareness of the safety aspects of	54, 82, 454–458, 607
supplemental restraint systems (SRS), electronic brake control	
systems, and hybrid vehicle high voltage circuits.	
14. Demonstrate awareness of the safety aspects of high	54, 82, 607
voltage circuits (such as high intensity discharge (HID) lamps,	
ignition systems, injection systems, etc.).	
15. Locate and demonstrate knowledge of material safety data	84–85
sheets (MSDS).	
Tools and Equipment	
1. Identify tools and their usage in automotive applications.	42–54, 59–71
2. Identify standard and metric designation.	89–90
3. Demonstrate safe handling and use of appropriate tools.	42, 51–52, 59–70
4. Demonstrate proper cleaning, storage, and maintenance of	41-42

Task Number and Description		Page #s
tools and equipment.		
5. Demonstrate proper use of precision measuring tools (i.e.,	e proper use of precision measuring tools (i.e., 91, 93–97, 1	
micrometer, dial-indicator, dial-caliper).		
Preparing Vehicle for Service		
1. Identify information needed and the service requested on a repair order.		114–115
2. Identify purpose and demonstrate proper use of fender covers, mats.		71
3. Demonstrate use of the three Cs (concern, cause, and correction).		112
4. Review vehicle service history.		
5. Complete work order to include customer information, vehicle identifying		114–115
information, customer concern, related service history, cause, and correction.		
Preparing Vehicle for Customer		
1. Ensure vehicle is prepared to return to customer per school/company		71, 1222
policy (floor mats, steering wheel cover, etc.).		

# Workplace Employability Skills

Task Number and Description	Page #s
Personal Standards	
1. Reports to work daily on time; able to take directions and motivated to	157, 230
accomplish the task at hand.	
2. Dresses appropriately and uses language and manners suitable for the	159
workplace.	
3. Maintains appropriate personal hygiene.	159
4. Meets and maintains employment eligibility criteria, such as drug/alcohol-	159
free status, clean driving record, etc.	
5. Demonstrates honesty, integrity, and reliability.	159, 230, 296, 342
Work Habits/Ethic	
1. Complies with workplace policies/laws.	1384
2. Contributes to the success of the team, assists others, and requests help	158–159, 180
when needed.	
3. Works well with all customers and coworkers.	72, 84, 180
4. Negotiates solutions to interpersonal and workplace conflicts.	158
5. Contributes ideas and initiative.	158
6. Follows directions.	158
7. Communicates (written and verbal) effectively with customers and	84, 159–160, 180
coworkers.	
8. Reads and interprets workplace documents; writes clearly and concisely.	160
9. Analyzes and resolves problems that arise in completing assigned tasks.	158

Task Number and Description	Page #s
10. Organizes and implements a productive plan of work.	158–159, 854–855
11. Uses scientific, technical, engineering, and mathematic principles and	89–105, 266–272, 316, 347–
reasoning to accomplish assigned tasks.	349, 1603–1604
12. Identifies and addresses the needs of all customers, providing helpful,	84, 160, 194, 296
courteous, and knowledgeable service and advice as needed.	