NATEF Task List

A6: 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.

VI. ELECTRICAL/ELECTRONIC SYSTEMS		
A. General Electrical System Diagnosis		Signed
		Date
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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
B. Battery Diagnosis and Service		
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 re-initialization or code entry following battery disconnect.	P-1	

9. Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
C. Starting System Diagnosis and Repair		
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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
D. Charging System Diagnosis and Repair		
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.	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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
E. Lighting Systems Diagnosis and Repair		
1. Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair		
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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
G. Horn and Wiper/Washer Diagnosis and Repair		
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	
VI. ELECTRICAL/ELECTRONIC SYSTEMS		
H. Accessories Diagnosis and Repair		
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	

Evaluation Matrix:

1 = Exposure/Observation
2 = Assisted in Performing
3 = Capable, Needs Practice
4 = Performed Satisfactorily
5 = Demonstrated Mastery

Electrical/Electronic Systems Task Priority Breakdown

P-1 = 28 _____No. Completed (95% - 26 Required for NATEF)
P-2 = 26 _____No. Completed (80% - 21 Required for NATEF)
P-3 = 11 _____No. Completed (50% - 6 Required for NATEF)

Instructor's Sign Off: _____ Date:_____