

**North Montco Technical Career Center
1265 Sunneytown Pike, Lansdale PA 19446**

Performance Evaluation/Assessment

Automotive Technology

NATEF Electrical/Electronic Systems

Standardized Integration Module (SIM)

Task 1: General Electrical System Diagnosis

Hours: 20

Date: 9/01/2008

Exit Outcome/Terminal Performance Objective:

- Demonstrates the ability to perform general electrical system diagnostics.

Enabling Objectives:

- Explains basic electronic/electrical theory.
- Explains basic electronic/electrical component operation.
- Explains steps to diagnose electronic/electrical system problems.
- Identifies basic electronic/electrical system components.
- Performs basic electronic/electrical diagnostics.
- Locate correct diagnostic, repair, service & maintenance information using ShopKey.

Mastery: All hands-on tasks must be completed to 100% accuracy and to industry standards.

To achieve Mastery of this task, the student must:

1. Participate in a lecture, view either the PowerPoint presentation or video of the material.
2. Participate in a demonstration of the task.
3. Participate in a guided application of the task.
4. Practice the task without the instructor.
5. Complete task to 100% accuracy.
6. Demonstrate or practice the task with another student.

PA Academic Standards/Assessment Anchors/Eligible Content

Science

PA Academic Standard:

3.1.10.C Apply patterns as repeated processes or recurring elements in science and technology.

3.4.10.B Analyze energy sources and transfers of heat.

Assessment Anchor:

S11.C.2.1 Analyze energy sources and transfer of energy, or conversion of energy.

S11.A.1.3 Describe and interpret patterns of change in natural and human-made systems.

Eligible Content:

S11.C.2.1.4 Use Ohm's Law to explain relative resistances, currents, and voltage.

S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).

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Math

PA Academic Standard:

2.8.11.P Analyze and explain systems of equations, systems of inequalities and matrices.

2.8.11.G Solve problems using analytic geometry.

Assessment Anchor:

M11.C.3.1 Solve problems using analytic geometry.

M11.D.1.1 Analyze and/or use patterns or relations.

Eligible Content:

M11.C.3.1.2 Relate slope to perpendicularity and/or parallelism

M11.A.2.1.1 Solve problems using operations with rational numbers including rates and percents (single and multi-step and multiple procedure operations) (e.g., distance, work and mixture problems, etc.).

M11.A.2.1.2 Solve problems using direct and inverse proportions.

Language Arts:

PA Academic Standard:

1.1.11.E Establish a reading vocabulary by identifying and correctly using new words acquired through the study of their relationships to other words.

1.1.11.F Understand the meaning of and apply key vocabulary across the various subject areas.

Assessment Anchor:

R11.A.1.1 Identify and apply the meaning of vocabulary.

R11.A.1.2 Identify and apply word recognition skills.

Eligible Content:

R11.A.1.1.1 Identify and/or apply meaning of multiple-meaning words used in text.

R11.A.1.2.2 Define and/or apply how the meaning of words or phrases changes when using context clues given in explanatory sentences.

Social Studies:

PA Academic Standard:

8.1.12.A Evaluate chronological thinking

Career Education & Work

PA Academic Standard:

13.1.11.A Relate careers to individual interests, abilities and aptitudes.

SAFETY NOTICE: In addition to following all North Montco Technical Career Center Automotive Technology Program Safety and MSDS Policies, refer to the specific vehicle's manufacturer's shop manual for complete safety details when performing these tasks.

NOTE: *Safety is not an option!* Although this information is very thorough, it is general and does not fully cover all safety rules, procedures and hazards.

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PERFORMANCE CRITERIA	Needs Practice	Satisfactory
Safety glasses must be worn at all times! Read all safety materials provided and observe all safety precautions demonstrated by your instructor.		
Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1		
Identify and interpret electrical/electronic system concern; determine necessary action. P-1		
Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins. P-1		
Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals). P-1		
Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law). P-1		
Use wiring diagrams during diagnosis of electrical circuit problems. P-1		
Demonstrate the proper use of a digital multimeter (DVOM) during diagnosis of electrical circuit problems. P-1		
Check electrical circuits with a test light; determine needed repairs. P-2		
Measure source voltage/voltage drop in electrical/electronic circuits using a digital multimeter (DVOM); determine needed repairs. P-1		
Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine needed repairs. P-1		
Check current flow in electrical/electronic circuits and components using an ammeter; determine needed repairs. P-1		
Check electrical circuits using fused jumper wires; determine needed repairs. P-1		
Find shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine needed repairs. P-1		
Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs. P-1		
Inspect and test fusible links, circuit breakers, and fuses; replace as needed. P-1		
Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits; repair or replace as needed. P-1		

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Remove and replace terminal end from connector, including micro/metri-pack connectors using the correct terminal tool. P-1		
Repair connectors and terminal ends. P-1		
Repair wiring harness (including CAN/BUS systems). P-1		
Identify correct solder and correctly perform solder repair of electrical wiring. P-1		
Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures. P-3		
Complete an Outline, Reading Grid, Summary and “Last-Word” Worksheet Packet for Chapters 1-10, 80, 29, 30, 31, 32, 33, 34, 37, 38, 78 and 79 from <i>Modern Automotive Technology</i>		
Score 80% or better on <i>Modern Automotive Technology</i> chapter tests 1-10 & 80		
Score 80% or better on <i>Modern Automotive Technology</i> chapter tests 29, 30, 31, 32, 33, 34, 37, 38, 77, 78 and 79		
Score 80% or better on Math Intro Lessons 1-5 & Math Lessons 1, 5 and 6 Homework Sheets		
Score 80% or better on ASE Practice Test 6		
Earn a passing grade on the AYES Electrical/Electronic Exit Exam A-6		

NOTES: