North Montco Technical Career Center
1265 Sumneytown Pike, Lansdale PA 19446

Performance Evaluation/Assessment

Automotive Technology

NATEF Brake Systems

Standardized Integration Module (SIM)

Task 2: Hydraulic System Diagnosis and Repair
Hours: 15
Date: 9/01/2008

Exit Outcome/Terminal Performance Objective:

- Demonstrate the ability to perform hydraulic system diagnosis and repair.

Enabling Objectives:

- Explains basic hydraulic brake system theory.
- Explains basic hydraulic brake system operation.
- Explains steps to diagnosis hydraulic brake system problems.
- Performs basic hydraulic brake system diagnosis.
- Identifies basic hydraulic brake system components.
- Performs basic hydraulic brake system repairs.
- 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

Academic Standards:
Science
PA Academic Standard:
4.3.10.C Explain biological diversity as an indicator of a healthy environment.
Assessment Anchor:
S11.A.3.1 Analyze the parts of a simple system, their roles, and their relationships to the system as a whole.
Eligible Content:
S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts.
S11.A.3.1.2 Analyze and predict the effect of making a change in one part of a system on the system as a whole.

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Math

PA Academic Standard:

2.2.11.A Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).

2.5.11.A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.

Assessment Anchor:

M11.A.2.1 Apply ratio and/or proportion in problem-solving situations.

M11.A.2.2 Use exponents, roots and/or absolute value to solve problems

Eligible Content:

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.2.2.1 Simplify/evaluate expressions involving positive and negative exponents, roots and/or absolute value

Language Arts

PA Academic Standard:

1.1.11.G Demonstrate after reading understanding and interpretation of both fiction and nonfiction text, including public documents.

1.2.11.A Read and understand essential content of informational texts and documents in all academic areas.

Assessment Anchor:

R11.A.2.3 Make inferences, draw conclusions, and make generalizations based on text.

Eligible Content:

R11.A.2.3.1 Make inferences and/or draw conclusions based on information from text.

R11.A.2.3.2 Cite evidence from text to support generalizations.

Social Studies

PA Academic Standard:

8.1.12.D Synthesize historical approach

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
Read and follow all covered and posted safety materials provided and 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 including MSDS.		
Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law). P-1		
Measure brake pedal height, travel, and free play (as applicable); determine necessary action. P-1		
Check master cylinder for internal/external leaks and proper operation; determine necessary action. P-1		
Remove, bench bleed, and reinstall master cylinder. P-1		
Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action. P-2		
Inspect brake lines, hoses, & fittings for leaks, dents, kinks, rust, cracks, bulging or wear; determine necessary action. P-1		
Replace brake lines, hoses, fittings, and supports. P-2		
Fabricate brake lines using proper material and flaring procedures (double flare and ISO types). P-2		
Select, handle, store, and fill brake fluids to proper level. P-1		
Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves. P-3		
Inspect, test, and/or replace components of brake warning light system. P-3		
Bleed and/or flush brake system. P-1		
Test brake fluid for contamination. P-1		
Complete an Outline, 3-4 Reading Grids, Summary and "Last-Word" Worksheet Packet for Chapters 1-10, 80, 71, 72 & 73 from *Modern Automotive Technology.*		
Score an 80% or better on *Modern Automotive Technology* Chapter Tests 1-10 & 80		
Score 80% or better on *Modern Automotive Technology* Chapter Tests 71, 72 and 73		
Score 80% or better on Math Intro Lessons 1-5 & Math Lessons 1, 2, 3, 14 and 15 Homework Sheets		
Score 80% or better on ASE Practice Test 5		
Earn a passing grade on the AYES Brake Exit Exam A-5		