AUTOMOTIVE ELECTRICAL

CONTEST GUIDELINES AND RULES

Requirements: Each contestant will take a skills assessment test immediately following the PDP testing on Thursday. This assessment will qualify the top 16 individuals to compete in the hands-on portion of the contest Friday morning.

Contest synopsis: Once the top 16 students are selected Friday, The contestants will report and participate in a timed station contest. The stations are module based or vehicle based. Contestants are expected to perform the task in each station. Test scores may be used in the evaluation of contestant performance.

Awards given at closing ceremonies:

1st gold medallion, tools and scholarships

2nd Silver medallion, tools and scholarships

3rd Bronze, tools and scholarships

Contest does not advance to National Skills USA competition

AUTOMOTIVE SERVICE

Electrical and Ignitions

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of automotive service technology.

First, refer to General Regulations, Page 9

CLOTHING REQUIREMENT

Official SkillsUSA light blue work shirt and navy pants; black, brown or tan leather work shoes; and safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not,
they must be covered with goggles.)

These regulations refer to clothing items that are pictured and described at: www.skillsusastore.org. If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

Note: Contestants must wear their official contest clothing to the contest orientation meeting.

ELIGIBILITY

Open to active SkillsUSA members enrolled in career and technical programs with automotive technician or automotive service technology as the occupational objective.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   a. All necessary tools and equipment for the contest

b. All necessary service publications for the contestants

2. Supplied by the contestant:

a. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty.

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the SkillsUSA website: www.skillsusa.org/compete/ updates.shtml

SCOPE OF THE CONTEST

The contest will be consistent with the automobile technician task list outlined in guidelines published by the National Institute for Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF) at: www.natef.org. Contestants will demonstrate their ability to perform jobs or skills selected from the standards mentioned above as determined by the SkillsUSA Georgia Championships technical committee.

Knowledge Performance

The contest will include a written knowledge test given by ASE, and will consist of questions covering A5 Automotive Brakes in the NATEF Automobile Program Standards and the ASE Catalog of Tests — Automobile Tests.

Skill Performance

The contest will include a series of workstations. Workstations consist of a vehicle and/or simulators, components and service publications.

Contest Guidelines

1. A variety of vehicles sold in the United States will be used in the contest. This will include both domestic and imported vehicles.

2. Safety, quality, ability to follow instructions and procedures, accuracy (in comparison with factory specifications), workmanship, and other skills representative of the trades identified by industry leaders will be judged.

3. A maximum of eight stations will be assigned. Each station must be broken down into specific task criteria and separate steps based on the task. For example:

Station No. 1 Wire test and repair segments

Identify faulty circuit = x points

Repair condition = x points

Assemble/retest = x points

Resistor board tests = x points

Compare values to specs = x points

Workmanship = x points

Safety practices = x points

4. The points allowed for each station will be assigned by the technical committee and will be based on the difficulty of each assigned task.

5. Time limits will be assigned for each task, but no bonus points will be awarded for early completion.

Standards and Competencies: High School

AST 2.0 — Perform vehicle engine performance diagnosis and testing to related tasks in the NATEF Automobile Program Standards — Automobile Engine Performance Task List (ASE Test A8)

2.1 Diagnose and repair an engine performance issue on a current model vehicle

2.2 Use a provided factory scan tool for the current model vehicle 2.2.1 Read DTC with scan tool

2.2.2 Read data with scan tool

2.2.3 Perform actuator test with scan tool

2.3 Use factory service information provided

2.3.1 Identify correct test procedures

2.3.2 Follow the correct test procedure

2.3.3 Identify connector pin-outs

2.3.4 Identify component locations

2.3.5 Use wiring schematics

2.4 Use provided test equipment

2.4.1 Use a DVOM or DMM

2.4.2 Use a test light

2.4.3 Use a fuel pressure gauge

2.5 Use a repair order

2.5.1 Verify complaint

2.5.2 Repair vehicle

2.5.3 Verify repair was successful

2.5.4 Identify components in the system

AST 3.0 — Perform vehicle body electrical diagnosis and testing to related tasks identified in the NATEF Automobile
Program Standards — Automobile
Electrical/Electronic Systems Task List (ASE Test A6)

3.1 Diagnose and repair a body electrical issue on a current model vehicle
3.2 Use a provided factory scan tool for the current model vehicle 3.2.1 Read DTC with scan tool
3.2.2 Read data with scan tool
3.2.3 Perform actuator test with scan tool
3.3 Use factory service information provided
3.3.1 Identify correct test procedures
3.3.2 Follow the correct test procedure
3.3.3 Identify connector pin-outs
3.3.4 Identify component locations
3.3.5 Use wiring schematics
3.4 Use provided test equipment
3.4.1 Use a DVOM or DMM
3.4.2 Use a test light
3.4.3 Use a battery or charging system tester
3.5 Use a repair order
3.5.1 Verify complaint
3.5.2 Repair vehicle
3.5.3 Verify repair was successful
3.5.4 Identify components in the system

AST 4.0 — Demonstrate application of environment, health and safety knowledge in auto service situations to related OSHA section 1910 standards and EPA standards

4.1 Identify personal protective equipment
4.2 Explain the use of personal protective equipment
4.3 Recall information about related EPA and OSHA requirements
4.4 Identify blood borne pathogens kits
4.5 Explain the use of blood borne pathogens kits
4.6 Answer questions from a provided MSDS sheet
4.7 Describe proper use of a fire extinguisher

AST 6.0 — Perform electronic circuit diagnosis, testing and wire repair to related tasks identified in the NATEF Automobile Program Standards — Automobile
Electrical/Electronic Systems Task List (ASE Test A6)

6.1 Construct an electrical circuit from supplied material and a wiring diagram 6.1.1 Check electrical circuit operation
6.1.2 Take electrical readings on the circuit with a DVOM. *Note:* A shunt may be used when measuring current.
6.1.3 Diagnose and repair the circuit
6.1.4 Confirm the repair of the circuit
6.2 Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits
6.2.1 Check electrical circuits with a test light and determine necessary action
6.3 Repair connectors and terminal ends
6.3.1 Repair wiring harness
6.3.2 Perform solder repair of electrical wiring

8.4 Use tools provided to complete task
8.5 Determine which components need replaced or repaired in a given situation

AST 12.0 — Use electrical service information resources

12.1 Locate specifications and other service information using electronic service information resources

AST 12.0 — Use electrical service information resources

12.1 Locate specifications and other service information using electronic service information resources

Committee Identified Academic Skills

The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills

- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Use scientific notation
- Solve practical problems involving percents
- Measure angles
- Find surface area and perimeter of twodimensional objects
- Find volume and surface area of threedimensional objects
- Apply transformations (rotate or turn, reflect or flip, translate or slide and dilate or scale) to geometric figures
- Solve problems using proportions, formulas and functions

- Use laws of exponents to perform operations

Science Skills

- Use the knowledge of potential and kinetic energy
- Use the knowledge of mechanical, chemical and electrical energy
- Use the knowledge of temperature scales, heat and heat transfer
- Use the knowledge of principles of electricity and magnetism
- Use the knowledge of static electricity, current electricity and circuits
- Use the knowledge of magnetic fields and electromagnets
- Use the knowledge of motors and generators

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Numbers and operations
- Algebra
- Geometry
- Measurement
- Data analysis and probability
- Problem solving
- Communication
- Connections
- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: standards.nctm.org/document/chapter7/index.htm. Select "Standards" from menu.

Science Standards

- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry
- Understands the scientific enterprise

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks.

Language Arts Standards

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works
- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes
- Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and nonprint texts
- Students conduct research on issues and interests by generating ideas and questions and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts and people) to communicate their discoveries in ways that suit their purpose and audience
- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts.
To view the standards, visit: www.ncte.org/standards.

Professional Development Test

Each individual contestant in both leadership and skill contests will be given a test taken from Levels 1 through 2 and the SkillsUSA manual of the Professional Development Program.