AUTOMOTIVE SERVICE TECHNOLOGY

PURPOSE

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

ELIGIBILITY

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

CLOTHING REQUIREMENTS

NYS SkillsUSA – Mechanic

- White crew neck short- sleeved T-shirt
- Work pants or jeans,
- Leather or steel toed work shoes.
- Long hair must be restrained.
- Safety glasses with side shields or goggles, (Prescription glasses can be used only if they are equipped with side shields and approved by OSHA(Z-87). If not, they must be covered with goggles.)

Note: **Contestants must wear their official contest clothing to the contest orientation meeting. Also bring #2 pencil, resume, and safety assurance form.**

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   a. All necessary tools and equipment for the competition
   b. All necessary service publications for the competitors
2. Supplied by the competitor:
   a. All competitors must create a one-page resume. See "Resume Requirement" below for guidelines.

RESUME REQUIREMENT

Competitors must create a one-page resume to submit at orientation.

DEVICES

Cell phones or other electronic devices not approved by the NYS Chairperson will be collected by the contest chair during the competition. Chairpersons will announce their acceptance by listing it on their standard or at the orientation meeting. In case of emergencies, advisors should allow the competitors to take their phones to the contest areas.

If the competitor uses their device in a manner that compromises the integrity of the competition, the competitor's score may be penalized.

SCOPE OF THE COMPETITION

Competitors will demonstrate their ability to perform jobs or skills selected from the standards mentioned above as determined by the SkillsUSA Championships technical committee. Committee membership includes American Honda Motor Co. Inc., ATech, ConsuLab, Gates Corp., General Motors, Hunter Engineering Co., Megatech Corp., National Institute for Automotive Service Excellence, Pittsburg State University, Snap-on Inc., S/P2, Toyota Motor North America, Inc., CCAR, Stellantias North America, Nissan North America, Lucas-Nuelle, Subaru of America, and Mercedes-Benz, USA.

KNOWLEDGE PERFORMANCE

All competitors are required to take the SkillsUSA professional development test at orientation.

The competition will include a written knowledge test given by ASE covering all eight automobile areas identified in the ASE Education Foundation Automobile Program Standards and the Official ASE Study Guide — Automobile Tests. The test for these high school and college/postsecondary competitions will be comprised of diagnostic and repair content from these skill areas: engine repair, automatic transmission/transaxle, manual drivetrain and axles, suspension and steering, brakes, electrical/electronic steering, heating and air conditioning and engine performance.

SKILLPERFORMANCE

The competition will include a series of workstations. Workstations consist of a vehicle and/or simulators, components, service publications, and interpersonal skills stations (such as Customer Service and Job Interview).

COMPETITION GUIDELINES

1. A variety of vehicles sold in the United States will be used in the competition. 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. 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

AST1.0—Perform vehicle HVAC system diagnosis and testing to related tasks in the ASE Education Foundation Automobile Program Standards — Automobile Heating and Air Conditioning Task List (ASE Test A7)

1.1. Diagnose and repair an inoperative HVAC system on a current model vehicle.
1.2. Use a provided factory scan tool for current model vehicle
  1.2.1. Read DTC with scan tool
  1.2.2. Read data with scan tool
  1.2.3. Perform actuator test with scan tool
1.3. Use factory service information provided
  1.3.1. Identify correct test procedures
  1.3.2. Follow the correct test procedure
  1.3.3. Identify connector pinouts
  1.3.4. Identify component locations
  1.3.5. Read and interpret wiring schematics
1.4. Use provided test equipment
  1.4.1. Use a DVOM or DMM
  1.4.2. Use a test light
  1.4.3. Use A/C service gauges
1.5. Use a repair order
  1.5.1. Verify complaint
  1.5.2. Repair vehicle
  1.5.3. Verify repair was successful
  1.5.4. Identify components in the system

AST2.0—Perform vehicle engine performance diagnosis and testing to related tasks in the ASE Education Foundation 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 pinouts
  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 gauge2.5
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

AST3.0—Performvehiclebodyelectrical diagnosisand testingto relatedtasks identifiedin the ASE Education Foundation 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
  3.1.1. Use a provided factory scan tool for the current model vehicle
  3.1.2. Read DTC with scan tool
  3.1.3. Read data with scan tool
3.2. 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 pinouts
  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 and explain the use of personal protective equipment
4.2. Recall information about automotive-related EPA and OSHA requirements
4.3. Identify and explain the use of blood borne pathogens kits.
4.4. Answer questions from a provided Safety Data Sheet (SDS)
4.5. Describe proper use of a fire extinguisher
4.6. Demonstrate knowledge of automotive lift safety best-practices
4.7. Demonstrate knowledge of automotive battery safety best-practices

AST5.0— Complete mock job interview for an automotive service technology related position

5.1. Conduct a mock job interview with appropriate professional behavior
5.2. Communicate clearly and effectively
5.3. Clearly and completely fill out a job application
5.4. Submit a copy of resume as directed in “Resume Requirement” above

AST6.0—Perform electronic circuit diagnosis, testing and wire repair to related tasks identified in the ASE Education Foundation 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

AST7.0—Perform steering, suspension, and wheel alignment to related tasks identified in the ASE Education Foundation Automobile Program Standards — Automobile Suspension and Steering Task List (ASE Test A4)

7.1. Identify wheel alignment tools

7.2. Explain practical application of tools

7.3. Identify OEM alignment products
- 7.3.1. Explain practical application or use of OEM products
- 7.3.2. Identify aftermarket alignment products
- 7.3.3. Explain practical application or use of aftermarket products

7.4. Identify steering suspension components

7.5. Explain alignment theory

7.6. Explain diagnosis of alignment conditions

7.7. Use reference materials provided

AST 8.0 — Perform manual drive train service, testing and diagnosis to related tasks identified in the ASE Education Foundation Automobile Program Standards — Automobile Manual Drive Train and Axles Task List (ASE Test A3)

8.1. Identify components manual drive trains, axles, drivelines, and transfer cases

8.2. Inspect clutch operating components for wear/damage; determine necessary action
- 8.2.1. Measure flywheel run-out and crankshaft endplay and determine necessary action
- 8.2.2. Inspect transmission/transaxle components for wear/damage and determine necessary action
- 8.2.3. Measure endplay/preloads on transmission/transaxle shafts and determine necessary action
- 8.2.4. Inspect, measure, reassemble and/or reinstall synchronizer assemblies
- 8.2.5. Inspect, measure, adjust and/or reassemble transaxle final drive assemblies
- 8.2.6. Check driveshaft phasing, measure driveshaft run-out and measure driveshaft operating angles
- 8.2.7. Measure companion flange run- out and determine necessary action
- 8.2.8. Inspect ring gear and measure run-out and determine necessary action
- 8.2.9. Measure and adjust drive pinion depth and drive pinion bearing preload

8.2.10. Measure and adjust side bearing preload, ring and pinion gear backlash and backlash variation
8.2.11. Check ring and pinion gear contact patterns and determine necessary action
8.2.12. Measure rotating torque on a limited slip differential and determine necessary action
8.2.13. Inspect and reinstall limited slip clutch components
8.3. Use factory service information provided to complete tasks
8.4. Use tools provided to complete task
8.5. Determine which components need replaced or repaired in each situation

AST 9.0 — Perform brake service, testing and diagnosis to related tasks identified in the ASE Education Foundation Automobile Program Standards–Automobile Brakes Task List (ASE Test A5)

9.1. Identify different brake components
9.2. Diagnose pressure concerns in the brake system using hydraulic principles
9.2.1. Fabricate brake lines (double flare and ISO types)
9.2.2. Inspect and measure brake drums and determine necessary action
9.2.3. Remove, inspect, and install brake shoes, springs, pins, clips, levers, adjusters, and other brake hardware
9.2.4. Remove, inspect, and install wheel cylinders
9.2.5. Pre-adjust brake shoes and parking brake before installing brake drums
9.2.6. Remove, inspect, and install caliper, pads and related hardware and determine necessary action
9.2.7. Clean, inspect and measure rotor with a dial indicator and a micrometer and determine necessary action
9.2.8. Check parking brake components; clean, lubricate, adjust, or replace as necessary
9.2.9. Inspect brake booster and determine necessary action
9.2.10. Remove, clean, inspect, repack, and install wheel bearings; install hub and adjust wheel bearings
9.3. Identify and inspect ABS components and determine necessary action
9.3.1. Diagnose ABS electronic controls and components
9.3.2. Test, diagnose and service ABS speed sensors, toothed ring and circuits using an oscilloscope
9.4. Use factory service information provided to complete the above task
9.5. Use tools provided to complete the above task

AST 10.0 — Perform automatic transmission service, testing and diagnosis to related tasks identified in the ASE Education Foundation Automobile Program Standards — Automobile Automatic Transmission/Transaxle Task List (ASE Test A2)

10.1. Identify components on a transmission
10.2. Diagnose and inspect a transmission
10.2.1. Check input or output shaft endplay
10.2.2. Check clutch clearances
10.2.3. Perform air checks on the clutches
10.2.4. Measure pump clearances
10.2.5. Diagnose electrical components on a transmission
10.3. Perform adjustments on a transmission

10.3.1. Perform valve body adjustments
10.3.2. Perform input or output shaft adjustments
10.3.3. Perform clutch pack adjustments
10.3.4. Perform range sensor adjustments

10.4. Disassemble and assemble components of a transmission
10.4.1. Disassemble and assemble the planetary gear train
10.4.2. Disassemble and assemble the front pump
10.4.3. Disassemble and assemble the valve body
10.4.4. Disassemble and assemble clutch packs

10.5. Use factory service information provided to complete tasks
10.6. Use tools provided to complete tasks

AST11.0—Performenginemeasuring,inspecting,serviceand diagnosison theheador block ofan engine torelated tasks identified in the ASE Education Foundation Automobile Program Standards — Automobile Engine Repair Task List (ASETestA1)

11.1. Measure and inspect the pistons and connecting rods
11.2. Measure and inspect cylinder diameter
11.3. Measure and inspect cylinder taper and bore with a dial bore gauge
11.4. Measure and inspect the cylinder head
11.5. Measure and inspect valve guides
11.6. Measure and inspect the valves
11.7. Measure and inspect valve stem to guide clearance
11.8. Measure and inspect the camshaft or crankshaft
11.9. Measure and inspect the valve springs
11.10. Measure and inspect valve timing
11.11. Measure and inspect the timing chain or belt
11.12. Identify the clearance specifications for any item requiring measuring and inspecting
11.13. Use the factory service information provided
11.14. Determine which components need to be replaced or repaired on a given engine head or block
11.15. Use the precision engine measurement tools required for measuring or inspecting

AST 12.0 — Use electrical service information resources

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