Auto Collision Repair

Study Guide

Assessments:
2002 Non-Structural Analysis & Damage Repair Technician
2005 Painting and Refinishing Technician

Aligned with the ASE/NATEF standards

Endorsed By:
The Oklahoma Automobile Dealers Association

OADA

OKLAHOMA WORKS
Overview

This study guide is designed to help students prepare for the Auto Collision Repair assessments. It not only includes information about the assessments, but also the skills standards upon which the assessments are based and test taking strategies.

Each of the four sections in this guide provides useful information for students preparing for the Auto Collision Repair assessments.

- CareerTech and Competency-Based Education: A Winning Combination
- Auto Collision Repair assessments
  - Assessment Information
  - Standards and Test Content
  - Sample Questions
  - Abbreviations, Symbols, and Acronyms
- Strategies for Test Taking Success
- Notes

These assessments are aligned with the 2016 National Institute for Automotive Service Excellence (ASE)/National Automotive Technicians Education Foundation (NATEF) standards and endorsed by the Oklahoma Automobile Dealers Association (OADA). The assessments measure a student's ability to apply knowledge of the skills necessary for success in the Auto Collision Repair sector.

NATEF: www.natef.org

The NATEF task list was reviewed and updated in April 2016 by a national committee of individuals representing collision repair and refinish shop owners and technicians, collision repair and refinish instructors, collision repair and refinish equipment and parts suppliers, and the Inter-Industry Conference on Auto Collision Repair (I-CAR). The committee had the most current ASE collision repair and refinish task lists for reference purposes.

The OADA (405-521-1295) consists of new car and heavy-duty truck dealers and a primary purpose of their organization is to promote the common business interests of those engaged in the automotive industry.

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CareerTech and Competency-Based Education: A Winning Combination

Competency-based education uses learning outcomes that emphasize both the application and creation of knowledge and the mastery of skills critical for success. In a competency-based education system, students advance upon mastery of competencies, which are measurable, transferable outcomes that empower students.

Career and technology education uses industry professionals and certification standards to identify the knowledge and skills needed to master an occupation. This input provides the foundation for development of curriculum, assessments and other instructional materials needed to prepare students for wealth-generating occupations and produce comprehensively trained, highly skilled employees demanded by the work force.

Tools for Success

CareerTech education relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

Skills standards provide the foundation for competency-based instruction and outline the knowledge and skills that must be mastered in order to perform related jobs within an industry. Skills standards are aligned with national skills standards and/or industry certification requirements; therefore, a student trained to the skills standards is equally employable in local, state and national job markets.

Curriculum materials and textbooks contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources include supplemental activities that enhance learning by providing opportunities to apply knowledge and demonstrate skills.

Certification Assessments test the student over material outlined in the skills standards and taught using the curriculum materials and textbooks. When used with classroom performance evaluations, certification assessments provide a means of measuring occupational readiness.

Each of these components satisfies a unique purpose in competency-based education and reinforces the knowledge and skills students need to gain employment and succeed on the job.

Measuring Success

Evaluation is an important component of competency-based education. Pre-training assessments measure the student’s existing knowledge prior to receiving instruction and ensure the student’s training builds upon this knowledge base. Formative assessments administered throughout the training process provide a means of continuously monitoring the student’s progress towards mastery.

Certification assessments provide a means of evaluating the student’s mastery of knowledge and skills. Coaching reports communicate assessment scores to students and provide a breakdown of assessment results by standard area. The coaching report also shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.
Auto Collision Repair Assessment Information

What are the Auto Collision Repair assessments?

The Non-Structural Analysis & Damage Repair Technician and Painting and Refinishing Technician assessments are end-of-program assessments for students in Auto Collision Repair education programs. The assessments provide an indication of student mastery of knowledge and concepts necessary for success in careers in these areas.

How were the assessments developed?

The assessments were developed by the CareerTech Testing Center. The assessments and standards align with the ASE/NATEF Standards and are endorsed by the Oklahoma Automobile Dealers Association. Items were developed and reviewed by a committee of subject matter experts.

The NATEF committee assigned a priority number, which determines the significance of each task for test development: HP-I or HP-G to all skills. These priority numbers pertain to requirements for instruction on tasks as follows:

HP-I: 95% must be taught in the curriculum.
HP-G: 90% must be taught in the curriculum.

What do the assessments cover?

Specifically, the tests include multiple-choice test items over the following areas:

**Non-Structure Analysis & Damage Repair Technician (55 questions)**
- Preparation 15%
- Outer Body Panel Repairs, Replacements and Adjustments 35%
- Metal Finishing and Body Filling 18%
- Moveable Glass and Hardware 2%
- Metal Welding and Cutting 25%
- Plastics and Adhesives 5%

**Painting and Refinishing Technician (55 questions)**
- Safety Precautions 13%
- Surface Preparation 26%
- Spray Gun and Related Equipment Operation 5%
- Paint Mixing, Matching and Applying 16%
- Paint Defects – Causes and Cures 29%
- Final Detail 11%

What are the benefits of using these assessments?

Students receive a certificate for each assessment that he/she passes. This certificate may be included in his/her portfolio and used to communicate the student's mastery of the subject matter to potential employers.
When should the assessment be taken?

The CareerTech Testing Center recommends that students take these assessments as soon as possible after receiving all standards-related instruction, rather than waiting until the end of the school year.

Is the assessment timed?

No. However, most students finish the assessment within one hour.

What resources can students use on these assessments?

Students are allowed to use calculators and scratch paper on CTTC assessments; however, these items must be provided by the testing proctor and returned to the proctor before the student's exam is submitted for scoring. Calculator apps on cell phones and other devices may not be used on these assessments.

What accommodations can be made for students with Individualized Education Plans (IEPs)?

Accommodations are allowed for students with an Individualized Education Plan. Examples of allowable accommodations include:

- Extended time — This assessment is not timed; therefore, students may take as much time as needed to finish. The assessment must be completed in one testing session.
- Readers — A reader may be used to read the assessment to a student who has been identified as needing this accommodation.
- Enlarged text — Students needing this accommodation can activate this feature by clicking the $\text{AA}$ icon in the upper right corner of the screen.

What can students expect on Test Day?

All CTTC assessments are web-based and delivered exclusively by a proctor in the school’s assessment center. The proctor cannot be an instructor or anyone who was involved with the students during instruction.

Assessments are delivered in a question-by-question format. When a question is presented, the student can select a response or leave the question unanswered and advance to the next question. Students may also flag questions to revisit before the test is scored. All questions must be answered before the test can be submitted for scoring.

After the assessment is scored, the student will receive a score report that not only shows the student’s score on the assessment, but also how the student performed in each standard area.
Can students retake the test?

Students may retake the test unless their school or state testing policies prohibit retesting. Students who can retest must wait at least three days between test attempts.
Standards and Test Content
Non-Structural Analysis & Damage Repair Technician

Preparation (8 questions)

1. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan (HP-I)
2. Inspect, remove, label, store, and reinstall exterior trim and moldings (HP-I)
3. Inspect, remove, label, store, and reinstall interior trim and components (HP-I)
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair (HP-I)
5. Inspect, remove, protect label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair (HP-G)
6. Protect panels, glass, interior parts, and other vehicles adjacent to the repair area (HP-I)
7. Soap and water wash entire vehicle; complete pre-repair inspection checklist (HP-I)
8. Prepare damaged area using water-based and solvent-based cleaners (HP-I)
9. Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs (HP-I)
10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair (HP-I)

Outer Body Panel Repairs, Replacements, and Adjustments (19 questions)

1. Inspect/locate direct, indirect, or hidden damage and direction of impact (HP-I)
2. Inspect, remove and replace mechanically fastened welded steel panel or panel assemblies (HP-G)
3. Determine the extent of damage to aluminum body panels; repair or replace (HP-G)
4. Inspect, remove, replace, and align hood, hood hinges, and hood latch (HP-G)
5. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch (HP-I)
6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware (HP-I)
7. Inspect, remove, replace, and align tailgates, hatches, liftgates, and sliding doors (HP-G)
8. Inspect, remove, replace, and align bumpers, covers, reinforcements, guards, impact absorbers, and mounting hardware (HP-I)
9. Inspect, remove, replace, and align fenders and related panels (HP-I)
10. Restore corrosion protection during and after the repair (HP-I)
11. Weld damaged or torn steel body panels; repair broken welds (HP-G)
12. Restore corrosion protection (HP-I)
13. Replace door skins (HP-G)
14. Restore sound deadeners and foam materials (HP-G)
15. Perform panel bonding and weld bonding (HP-G)
16. Weld damaged or torn steel body panels; repair broken welds (HP-G)
17. Identify one-time use fasteners (HP-G)

**Metal Finishing and Body Filling (10 questions)**

1. Prepare a panel for body filler by abrading or removing the coatings; featheredge and refine scratches before the application of body filler (HP-I)
2. Locate and repair surface irregularities on a damaged body panel using power tools, hand tools, and weld-on pulling attachments (HP-I)
3. Demonstrate hammer and dolly techniques (HP-I)
4. Heat shrink stretched panel areas to proper contour (HP-I)
5. Cold shrink stretched panel areas to proper contour (HP-I)
6. Identify body filler defects; correct the cause and condition (pinholing, ghosting, staining, over catalyzing, etc.) (HP-I)
7. Identify different types of body fillers (HP-G)
8. Shape sand body filler to contour; finish sand (HP-I)
9. Perform the proper metal finishing techniques for aluminum (HP-I)
10. Perform proper application of body filler to aluminum (HP-G)
11. Straighten contours of damaged panels to a suitable condition for body fillings or metal finishing using power tools, hand tools, and weld-on pulling attachments (HP-G)

**Moveable Glass and Hardware (1 questions)**

1. Inspect, adjust, repair, or replace window regulators, run channels, glass, power mechanisms, and related controls (HP-I)
2. Inspect, adjust, repair, remove, reinstall, or replace weather-stripping (HP-G)
3. Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs (HP-G)
4. Inspect, remove, reinstall, and align convertible top and related mechanisms (HP-G)
5. Initialize electrical components as needed (HP-G)
Metal Welding and Cutting (14 questions)

1. Identify weldable and non-weldable substrates used in vehicle construction (HP-I)
2. Weld and cut high-strength steel and other steels (HP-I)
3. Weld and cut aluminum (HP-G)
4. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation (HP-I)
5. Set up and adjust the GMAW (MIG) welder to “tune” for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded (HP-I)
6. Store, handle, and install high-pressure gas cylinders (HP-I)
7. Determine work clamp (ground) location and attach (HP-I)
8. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions (HP-I)
9. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations (HP-I)
10. Protect computers and other electronic control modules during welding procedures (HP-I)
11. Clean and prepare the metal to be welded; assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required (HP-I)
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made (HP-I)
13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation (HP-I)
14. Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc. (HP-I)
15. Perform visual and destructive tests on each weld type (HP-I)
16. Identify the causes of various welding defects; make necessary adjustments (HP-I)
17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments (HP-I)
18. Identify cutting process for different substrates and locations; perform cutting operation (HP-I)
19. Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc. (HP-G)

Plastics and Adhesives (3 questions)

1. Identify the types of plastics; determine reparability (HP-I)
2. Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures (HP-I)
3. Repair rigid, semi-rigid, and flexible plastic panels (HP-I)
4. Remove or repair damaged areas from rigid exterior composite panels (HP-G)
5. Replace bonded rigid exterior composite body panels; straighten or align panel supports (HP-G)
Standards and Test Content
Painting and Refinishing Technician

Safety Precautions (7 questions)

1. Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials according to federal, state, and local regulations (HP-I)
2. Identify safety and personal health hazards according to OSHA guidelines and the “Right to Know Law” (HP-I)
3. Inspect spray environment and equipment to ensure compliance with federal, state, and local regulations, and for safety and cleanliness hazards (HP-I)
4. Select and use a NIOSH-approved air purifying respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation (HP-I)
5. Select and use the NIOSH-approved supplied air (Fresh Air Make-up) respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation (HP-I)
6. Select and use the proper personal safety equipment for surface preparation, spray gun, and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye, and ear protection, etc.) (HP-I)

Surface Preparation (14 questions)

1. Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation (HP-I)
2. Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants (HP-I)
3. Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system (HP-G)
4. Strip paint to bare substrate (paint removed) (HP-I)
5. Dry or wet sand areas to be refinished (HP-I)
6. Featheredge areas to be refinished (HP-I)
7. Apply suitable metal treatment or primer in accordance with total product systems (HP-I)
8. Mask and protect other areas that will not be refinished (HP-I)
9. Mix primer, primer-surfacer, or primer-sealer (HP-I)
10. Identify a complimentary color or shade of undercoat to improve coverage (HP-G)
11. Apply primer onto surface of repaired area (HP-I)
12. Apply two-component finishing filler to minor surface imperfections (HP-I)
13. Block sand area to which primer-surfacer has been applied (HP-I)
14. Dry sand area to which finishing filler has been applied (HP-I)
15. Remove dust from area to be refinished, including cracks or moldings of adjacent areas (HP-I)
16. Clean area to be refinished using a final cleaning solution (HP-I)
17. Remove, with a tack rag, any dust or lint particles from the area to be refinished (HP-I)
18. Apply suitable sealer to the area being refinished (HP-I)
19. Scuff sand to remove nibs or imperfections from a sealer (HP-I)
20. Apply stone chip resistance coating (HP-G)
21. Restore caulking and seam sealers to repaired areas (HP-G)
22. Prepare adjacent panels for blending (HP-I)
23. Identify the types of rigid, semi-rigid or flexible plastic parts to be finished; determine the materials needed, preparation, and refinishing procedures (HP-I)
24. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures (HP-I)

Spray Gun and Related Equipment Operation (3 questions)

1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment) (HP-I)
2. Select spray gun setup (fluid needle, nozzle, and cap) for product being applied (HP-I)
3. Test and adjust spray gun using fluid, air and pattern control valves (HP-I)
4. Demonstrate an understanding of the operation of pressure spray equipment (HP-G)

Paint Mixing, Matching and Applying (9 questions)

1. Identify color code by manufacturer’s vehicle information label (HP-I)
2. Shake, stir, reduce, catalyze/activate, and strain refinish materials (HP-I)
3. Apply finish using appropriate spray technique (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied (HP-I)
4. Apply selected product on test and let-down panel; check for color match (HP-I)
5. Apply single stage topcoat (HP-G)
6. Apply basecoat/clear coat for panel blending or panel refinishing (HP-I)
7. Apply basecoat/clear coat for overall refinishing (HP-G)
8. Remove nibs or imperfections from basecoat (HP-I)
9. Identify product expiration dates as applicable (HP-G)
10. Refinish plastic parts (HP-I)
11. Apply multi-stage coats for panel blending and overall refinishing (HP-G)
12. Identify and mix paint using a formula (HP-I)
13. Identify poor hiding colors; determine necessary action (HP-G)
14. Tint color using formula to achieve a blendable match (HP-I)
15. Identify alternative color formula to achieve a blendable match (HP-I)
16. Identify the materials equipment, and preparation differences between solvent and waterborne technologies (HP-G)

Paint Defects – Causes and Cures (16 questions)

1. Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition (HP-G)
2. Identify a dry spray appearance in the paint surface; determine the cause(s) and correct the condition (HP-I)
3. Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition (HP-I)
4. Identify lifting; determine the cause(s) and correct the condition (HP-G)
5. Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition (HP-I)
6. Identify orange peel; determine the cause(s) and correct the condition (HP-I)
7. Identify overspray; determine the cause(s) and correct the condition (HP-I)
8. Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition (HP-G)
9. Identify sags and runs in paint surface; determine the cause(s) and correct the condition (HP-I)
10. Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition (HP-I)
11. Identify contour mapping/edge mapping while finish is drying; determine the cause(s) and correct the condition (HP-G)
12. Identify color difference (off-shade); determine the cause(s) and correct the condition (HP-G)
13. Identify tape tracking; determine the cause(s) and correct the condition (HP-G)
14. Identify low gloss condition; determine the cause(s) and correct the condition (HP-G)
15. Identify poor adhesion; determine the cause(s) and correct the condition (HP-G)
16. Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition (HP-G)

17. Identify corrosion; determine the cause(s) and correct the condition (HP-G)

18. Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition (HP-I)

19. Identify water spotting; determine the cause(s) and correct the condition (HP-G)

20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition (HP-G)

21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition (HP-G)

22. Identify the die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition (HP-G)

23. Identify chalking (oxidation); determine the cause(s) and correct the condition (HP-G)

24. Identify bleed-through (staining); determine the cause(s) and correct the condition (HP-G)

25. Identify pin-holing; determine the cause(s) and correct the condition (HP-G)

26. Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition (HP-I)

27. Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition (HP-G)

**Final Detail (6 questions)**

1. Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc. (HP-G)

2. Sand, buff and polish fresh or existing finish to remove defects as required (HP-I)

3. Clean interior, exterior, and glass (HP-I)

4. Clean body openings (door jams and edges, etc.) (HP-I)

5. Remove overspray (HP-I)

6. Perform vehicle clean-up; complete quality control using a checklist (HP-I)
Sample Questions

1. Technician A says that the repair plan can only be developed after the vehicle has been on a frame machine. Technician B says that the repair plan is developed before and during the repair process. Who is correct?
   a. Technician A
   b. Technician B
   c. Both Technician A and Technician B
   d. Neither Technician A nor Technician B

2. What is a major characteristic of an aluminum panel?
   a. good memory
   b. heavier than steel
   c. lighter than steel
   d. poor dent resistance

3. When aligning the doors on a four-door car, which should be aligned first?
   a. front door to the fender
   b. front door to the rear door
   c. front fender to the hood
   d. rear door to the quarter panel

4. Porosity in welds can be caused by:
   a. excessive current.
   b. ground too far away.
   c. a lack of shielding gas.
   d. travel speed too slow.

5. Which primer should be used on bare high strength steel (HSS)?
   a. adhesion promoter
   b. lacquer primer
   c. self-etching primer
   d. zinc chromate

6. To help eliminate paint clogging the sand paper, the painter should use:
   a. block sanding.
   b. disc sanding.
   c. dry sanding.
   d. wet sanding.
7. The type of metal conditioner to be used is determined by the:
   a. temperature at the time of application.
   b. thickness of the metal substrate.
   c. type of finish being used.
   d. type of metal to be treated.

8. A sealer should be applied:
   a. after the color coats.
   b. before sanding.
   c. before the color coats.
   d. between each color coat.

9. Technician A says to adjust air pressure at the air compressor. Technician B says pressure is best adjusted at the gun. Who is correct?
   a. Technician A
   b. Technician B
   c. Both Technician A and Technician B
   d. Neither Technician A nor Technician B

10. Technician A says some primers can be used direct to metal (DTM). Technician B says some primer surfacers can be used direct to metal (DTM). Who is correct?
    a. Technician A
    b. Technician B
    c. Both Technician A and Technician B
    d. Neither Technician A nor Technician B
Sample Questions — Key

1. Technician A says that the repair plan can only be developed after the vehicle has been on a frame machine. Technician B says that the repair plan is developed before and during the repair process. Who is correct?
   a. Technician A  Wrong, but plausible
   b. Technician B  Correct
   c. Both Technician A and Technician B  Wrong, but plausible
   d. Neither Technician A nor Technician B  Wrong, but plausible

2. What is a major characteristic of an aluminum panel?
   a. good memory  Wrong, but plausible
   b. heavier than steel  Wrong, but plausible
   c. lighter than steel  Correct
   d. poor dent resistance  Wrong, but plausible

3. When aligning the doors on a four-door car, which should be aligned first?
   a. front door to the fender  Wrong, but plausible
   b. front door to the rear door  Wrong, but plausible
   c. front fender to the hood  Wrong, but plausible
   d. rear door to the quarter panel  Correct

4. Porosity in welds can be caused by:
   a. excessive current.  Wrong, but plausible
   b. ground too far away.  Wrong, but plausible
   c. a lack of shielding gas.  Correct
   d. travel speed too slow.  Wrong, but plausible

5. Which primer should be used on bare high strength steel (HSS)?
   a. adhesion promoter  Wrong, but plausible
   b. lacquer primer  Wrong, but plausible
   c. self-etching primer  Correct
   d. zinc chromate  Wrong, but plausible

6. To help eliminate paint clogging the sand paper, the painter should use:
   a. block sanding.  Wrong, but plausible
   b. disc sanding.  Wrong, but plausible
   c. dry sanding.  Wrong, but plausible
   d. wet sanding.  Correct
7. The type of metal conditioner to be used is determined by the:

   a. temperature at the time of application.  Wrong, but plausible
   b. thickness of the metal substrate. Wrong, but plausible
   c. type of finish being used. Wrong, but plausible
   d. type of metal to be treated. Correct

8. A sealer should be applied:

   a. after the color coats. Wrong, but plausible
   b. before sanding. Wrong, but plausible
   c. before the color coats. Correct
   d. between each color coat. Wrong, but plausible

9. Technician A says to adjust air pressure at the air compressor. Technician B says pressure is best adjusted at the gun. Who is correct?

   a. Technician A Wrong, but plausible
   b. Technician B Correct
   c. Both Technician A and Technician B Wrong, but plausible
   d. Neither Technician A nor Technician B Wrong, but plausible

10. Technician A says some primers can be used direct to metal (DTM). Technician B says some primer surfacers can be used direct to metal (DTM). Who is correct?

    a. Technician A Wrong, but plausible
    b. Technician B Wrong, but plausible
    c. Both Technician A and Technician B Correct
    d. Neither Technician A nor Technician B Wrong, but plausible
Abbreviations, Symbols and Acronyms

When abbreviations, symbols or acronyms are more commonly used in written and verbal communications within the automotive industry than the words they represent, they will also be used on the written examination required for competency. The following is a list of abbreviations, symbols and acronyms used on the automotive examinations.

\begin{itemize}
  \item ` Feet
  \item " Inches
  \item ° Degrees
  \item $ Dollars
  \item $O_2$ Oxygen
  \item % Percent
  \item 2K a coating that needs a hardener
  \item ABS anti-lock brake system
  \item AC alternating current
  \item A/C air conditioning
  \item ASE Automotive Service Excellence
  \item ATF automatic transmission fluid
  \item BCM body control module
  \item CAN/BUS Controller Area Network
  \item CCA cold cranking amp
  \item CV constant-velocity
  \item CVT continuously variable transmission
  \item DC direct current
  \item DEF diesel exhaust fluid
  \item DMM digital multimeter
  \item DTC diagnostic trouble code
  \item DVOM digital volt/ohm meter
  \item ECM electronic control module
  \item EGR exhaust gas recirculation
  \item EVAP evaporative emission
  \item Ft feet
  \item FWD front wheel drive
  \item GTX a name of a GE developed plastic (Noryl GTX)
  \item HEPA high-efficiency particulate arrestance
  \item Hg Mercury
  \item HVAC heating, ventilation, and air conditioning
  \item IAC idle air control
  \item ID inside diameter
  \item ln inch
  \item IP instrument panel
  \item ISO International Organization for Standardization
  \item kV kilovolts
  \item MIG metal inert gas
  \item MIL malfunction indicator lamp
  \item mm millimeter
  \item MPH miles per hour
\end{itemize}
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS</td>
<td>material safety data sheet</td>
</tr>
<tr>
<td>NATEF</td>
<td>National Automotive Technicians Education Foundation</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>OBD</td>
<td>On-Board Diagnostics</td>
</tr>
<tr>
<td>OEM</td>
<td>original equipment manufacturer</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>PAG</td>
<td>polyalkylene glycol</td>
</tr>
<tr>
<td>PCV</td>
<td>positive crankcase ventilation</td>
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<tr>
<td>PM</td>
<td>permanent generator</td>
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<tr>
<td>POA</td>
<td>pilot operated absolute</td>
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<tr>
<td>PSI</td>
<td>pounds per square inch</td>
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<tr>
<td>RPM</td>
<td>revolutions per minute</td>
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<tr>
<td>SAI</td>
<td>steering axis inclination</td>
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<tr>
<td>SMC</td>
<td>sheet moulded compound</td>
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<tr>
<td>SRS</td>
<td>supplemental restraint system</td>
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<tr>
<td>STRSW</td>
<td>squeeze type resistance spot welding</td>
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<tr>
<td>TDC</td>
<td>top dead center</td>
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<tr>
<td>TEO</td>
<td>thermoplastic elastomeric olefin</td>
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<tr>
<td>TIG</td>
<td>tungsten inert gas</td>
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<tr>
<td>TPS</td>
<td>throttle position sensor</td>
</tr>
<tr>
<td>TSB</td>
<td>Transportation Safety Bulletin</td>
</tr>
<tr>
<td>TV</td>
<td>throttle valve</td>
</tr>
<tr>
<td>USB</td>
<td>universal serial bus</td>
</tr>
<tr>
<td>V</td>
<td>volt</td>
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<tr>
<td>VOC</td>
<td>volatile organic compounds</td>
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</tbody>
</table>
Test Taking Strategies

This section of the study guide contains valuable information for testing success and provides a common-sense approach for preparing for and performing well on any test.

General Testing Advice

1. Get a good night’s rest the night before the test — eight hours of sleep is recommended.
2. Avoid junk food and “eat right” several days before the test.
3. Do not drink a lot or eat a large meal prior to testing.
4. Be confident in your knowledge and skills!
5. Relax and try to ignore distractions during the test.
6. Focus on the task at hand — taking the test and doing your best!
7. Listen carefully to the instructions provided by the exam proctor. If the instructions are not clear, ask for clarification.

Testing Tips

1. Read the entire question before attempting to answer it.
2. Try to answer the question before reading the choices. Then, read the choices to determine if one matches, or is similar, to your answer.
3. Do not change your answer unless you misread the question or are certain that your first answer is incorrect.
4. Answer questions you know first, so you can spend additional time on the more difficult questions.
5. Check to make sure you have answered every question before you submit the assessment for scoring — unanswered questions are marked incorrect.