



THE OFFICIAL  
ASE CATALOG OF TESTS

**ASE**

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**Truck**

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**Equipment**

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**Tests**

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# ***ASE Truck Equipment Tests***

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# OVERVIEW

## **Introduction**

This *Catalog* is intended to help truck equipment technicians study for ASE certification tests. It was written by the same people who develop and assemble the actual ASE tests and, therefore, should be very useful for reviewing technical knowledge and seeking additional reference material.

ASE voluntary certification is a means by which technicians can prove their abilities to themselves, to their employers, and to their customers. By passing ASE tests you will earn the most valuable credential available to truck equipment technicians. Because the tests are tough, you'll have the satisfaction of proving to yourself that you are among the elite in your profession. What's more, these credentials are recognized throughout the nation.

Certified technicians promote customer trust and improve the image of the industry. And trust and professionalism are the first steps to a better, more prosperous business.

ASE encourages you to take the tests and to join the proven pros who wear The ASE Blue Seal of Excellence.®

## **How Do I Become Certified?**

There are currently three tests in the Truck Equipment Technician certification series. If you pass one or more tests and have at least two years of relevant hands-on work experience, you will become certified as an ASE Truck Equipment Technician. If you pass all three tests in the series and meet the experience requirement, you will earn the certificate of Master Truck Equipment Technician.

If you fail a test, you may take it again during any scheduled test administration in which it is offered. And remember, you are the only one who will receive your tests scores; results will not be given over the phone nor will they be released to anyone without your written permission.

## **Truck Equipment Tests**

ASE tests and certifies technicians in the following truck equipment areas:

- Truck Equipment Installation and Repair (Test E1)

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## OVERVIEW (CONTINUED)

- Electrical/Electronic Systems Installation and Repair (Test E2)
- Auxiliary Power Systems Installation and Repair (Test E3)

ASE also offers certification in Automobile, Alternate Fuels, Medium/Heavy Truck, School Bus, Collision Repair/Refinish, Engine Machinist, Parts Specialist, and Advanced Level specialties.

For additional information on ASE testing, you can receive the *ASE Registration Booklet* by mailing the coupon printed on the back cover of this booklet. The *Registration Booklet* will give you the test dates, locations and other information about ASE's certification program. It also contains a test registration form.

### **Who Writes the Questions?**

The questions, written by service industry experts familiar with all aspects of truck equipment installation and repair, are entirely job-related. They are designed to test the skills that you need to know in installing and servicing truck equipment; theoretical knowledge is not covered.

Each question has its roots in an ASE "item-writing" workshop where service representatives from truck equipment manufacturers, aftermarket parts and equipment manufacturers, working technicians and vocational educators get together in a workshop setting to share ideas and translate them into test questions. Each test question written by these experts must survive review by all members of the group. The questions are written to deal with practical problems of installation, diagnosis, and repair experienced by technicians in their day-to-day work.

From there, all questions are pre-tested and quality-checked on a national sample of technicians. Those questions that meet ASE standards of quality and accuracy are included in the tests; the "rejects" are sent back to the drawing board or discarded altogether.

Each certification test is made up of 45–50<sup>1</sup> multiple-choice questions. The testing sessions are 4 hours and 15 minutes, allowing plenty of time to complete several tests.

<sup>1</sup>*Note:* The test could contain up to ten additional questions that are included for statistical research purposes only. Your answers to these questions will not affect your test score, but since you do not know which ones they are, you should answer all questions in the test.



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## OVERVIEW (CONTINUED)

### ***How Do I Prepare for the ASE Tests?***

Become familiar with test content and question format: The Test Specifications for each of the tests covered in this booklet contain a summary description of the content covered by each test. The Task Lists describe the actual work performed by technicians in each specialty area. Together, these form a “blueprint” for writing and assembling the ASE tests.

Please note that each question on the test is keyed or linked to a particular task or set of tasks in the task list. Therefore, a review of the task lists, with an eye to judging whether you know how to perform each task listed, will provide valuable information to prepare for the tests.

There are five types of multiple-choice questions on the tests, each of which is included in the sample questions in this booklet. Note the different instructions for some questions.

Be sure to read each question carefully, (twice, if necessary) so that you understand exactly what is being asked. *Each question tests a specific diagnostic or repair problem and has only one best answer.*

To summarize, we suggest the following steps to be taken to prepare for the tests:

- Step 1.** Study the content list for each test you will attempt.
- Step 2.** Carefully read the task list for each area.
- Step 3.** Go over the sample questions to become familiar with each question type. *This is very important.*
- Step 4.** Review steps 1 through 3 above, and identify the skill areas where you need additional study.

### ***Types of Knowledge Measured by the Tests***

The types of knowledge and skills you will need to know to pass the tests are as follows:

- **Basic technical knowledge:** Tests your knowledge of what is in a system and how the system works, and what are the proper procedures and/or precautions to be followed in making installations, modifications, repairs and adjustments.

- **Service or repair knowledge and skill:** Tests your understanding and ability to apply generally accepted procedures and precautions in installation and repair operations; and in making inspections and adjustments. Also tests ability to use shop manuals and precision tools of the trade.





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## OVERVIEW (CONTINUED)

- **Testing and diagnostic knowledge and skill:** Tests your ability to recognize problems and to use generally available measurement and testing equipment to make a diagnosis. Also tests your ability to trace the effects of a particular condition and find the cause of a particular set of symptoms.

If you are an experienced and competent technician, a careful review of this booklet, and additional brush-up on those areas in which you are weakest, is all you should need to pass the ASE tests.

### ***Before The Tests***

Try to be well rested for the tests so you will be alert and efficient. Have three or four sharpened soft-lead (#2) pencils and an eraser with you; pencils will not be furnished at the test center. If you wish to pace yourself, bring a watch, since some testing rooms may not have clocks. Finally, be sure to bring along your test center admission ticket and some form of identification.

### ***At the Test Center***

When you reach the test center, wait in the assigned area until the proctor begins the test administration. He or she will instruct you in filling out the answer folder and will tell you the amount of time allotted for each test.

Once the test has begun, keep track of time. Do not spend too long on any one question. If a question is difficult, mark the answer that you think is correct and put a check by it in the test book. Then go on to the next question. If you finish before the allotted time, you may go back to the questions that you checked.

**It is to your advantage to answer every question. Do not leave any answers blank. Your score will be based on the number of correct answers that you give.**

### ***Test Content and Sample Questions***

The following material is designed to help technicians prepare for ASE certification tests.

Each of the sections begins with the Test Specifications, which list the main categories covered on that particular test and the number of test questions and percentage of the test devoted to each topic.

The Task List describes the work activities a technician should be able to perform in each technical area covered on that test. This list was developed by working technicians and technical experts from across the country and will provide a valuable check list of what to study for the test.



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## OVERVIEW (CONTINUED)

It should be noted that the number of questions in each content area may not equal the number of tasks listed. Some of the tasks are complex and broad in scope and may be covered by several questions. Other tasks are simple and narrow in scope and one question may cover several tasks. The main objective in listing the tasks is to describe accurately what is done on the job, not to make each task correspond to a particular test question.

Sample questions follow. Although these same questions will not appear on actual tests, they are in the same format as actual test questions. All five types of multiple-choice questions used on the ASE tests are represented here. Note the different instructions for some questions. ■



# TEST SPECIFICATIONS AND TASK LIST

## TRUCK EQUIPMENT INSTALLATION AND REPAIR (TEST E1)

| Content Area                               | Questions in Test | Percentage of Test |
|--|-------------------|--------------------|
| A. Frame Preparation                       | 11                | 25%                |
| B. Suspension Systems                      | 5                 | 11%                |
| 1. Preparation and Installation (3)        |                   |                    |
| 2. Inspection and Repair (2)               |                   |                    |
| C. Driveshaft Preparation and Installation | 5                 | 11%                |
| D. Body and Equipment                      | 24                | 53%                |
| 1. Preparation (8)                         |                   |                    |
| 2. Installation and Repair (16)            |                   |                    |
| <b>Total</b>                               | <b>45</b>         | <b>100%</b>        |

### A. Frame Preparation (11 questions)

1. Verify wheelbase/cab-to-axle (cab-to-trunnion) measurements and tandem axle spread.
2. Verify gross vehicle weight rating (GVWR) and gross axle weight rating (GAWR).
3. Verify frame width, height, and length.
4. Determine body/equipment layout locations.
5. Remove and relocate frame mounted vehicle components as necessary.
6. Repair, lengthen, or shorten frame and frame members by fish (double) plating and welding in accordance with manufacturers' recommended procedures.
7. Layout and drill mounting holes in accordance with manufacturers' recommended procedures.
8. Disconnect battery and weld-sensitive chassis components.
9. Inspect frame and frame members for cracks, breaks, distortion, elongated holes, looseness, and damage; determine needed repairs.
10. Inspect, install, or repair frame, hangers, brackets, and crossmembers in accordance with manufacturers' recommended procedures.

### B. Suspension Systems (5 questions)

#### 1. Preparation and Installation (3 questions)

1. Relocate suspension components as necessary.
2. Determine additional auxiliary axle location(s); install in accordance with manufacturers' recommended procedures.
3. Install additional suspension components including leaf springs, air bags, stabilizers (torsion bars), stop blocks, spacer blocks, tanks, and valves/ controls.



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## E1 TASK LIST (CONTINUED)

4. Check driveshaft-to-moving component clearances.
5. Verify proper routing of air lines.
6. Weld axle to suspension seats, as necessary, in accordance with manufacturers' recommended procedures.

### 2. Inspection and Repair (2 questions)

**NOTE:** Tasks 1 through 10 apply to used chassis components and should be accomplished as necessary.

1. Inspect and replace front axles, U-bolts, and nuts.
2. Inspect, service, adjust, or replace king pin, steering knuckle bushings, locks, bearings, seals, and covers.
3. Inspect, service, and replace shock absorbers, bushings, brackets, and mounts.
4. Inspect, repair, or replace leaf springs, center bolts, clips, eye bolts and bushings, shackles, slippers, insulators, brackets, and mounts.
5. Inspect, adjust, or replace torque arms, bushings, and mounts.
6. Inspect, adjust, or replace axle aligning devices such as radius rods, track bars, stabilizer bars and bushings, mounts, shims, and cams.
7. Inspect or replace walking beams, center (cross) tube, bushings, mounts, load pads, and caps.
8. Inspect, test, adjust, repair, or replace air suspension pressure regulator and height control valves, lines, hoses, and fittings.
9. Inspect, test, repair, or replace air bags, springs, mounting plates, suspension arms, and bushings.
10. Measure vehicle ride height; determine needed adjustments or repairs.

### C. Driveshaft Preparation (5 questions)

1. Lay out driveshaft; determine new driveshaft length.
2. Inspect driveshaft for proper phasing.
3. Install driveshaft; measure and adjust operating angles (loaded and unloaded where applicable).
4. Lubricate universal joints and splines.
5. Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, universal joints, and retaining hardware; properly phase yokes.
6. Inspect, repair, and replace driveshaft center support bearings and mounts.

### D. Body and Equipment (24 questions)

#### 1. Preparation (8 questions)

1. Verify body/equipment mounting location on vehicle.
2. Select and install proper body spacers (sill plates).
3. Lay out body and equipment mounting holes; select proper drill sizes.
4. Identify fastener grade, diameter, and length.
5. Select appropriate cutting/welding tools and equipment; perform cutting and welding procedures.

#### 2. Installation (16 questions)

1. Fabricate and install sub-frames as required.
2. Install body, and/or equipment, and related components.
3. Install, connect, and test all Federally required lighting and reflector systems.

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## E1 TASK LIST (CONTINUED)

4. Install fuel filler in accordance with manufacturers' recommended procedures.
5. Install federally-required rear end/impact protection.
6. Construct and install appropriate guards and shields.
7. Connect auxiliary HVAC in accordance with manufacturers' recommended procedures.
8. Furnish and install informational, operational, and safety labels, and manuals in appropriate locations.
9. Verify that proper DOT certification labels are attached. ■



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# SAMPLE QUESTIONS

## TRUCK EQUIPMENT INSTALLATION AND REPAIR (TEST E1)

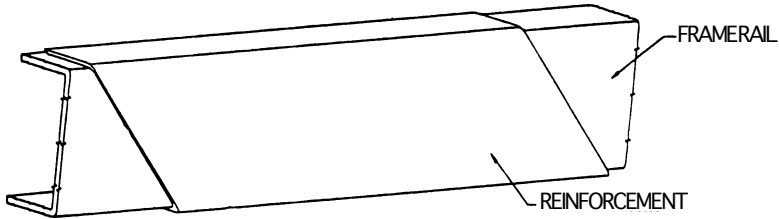
### Questions:

1. The correct placement of a suspension load pressure air gauge is:  
(A) before the air control switch.  
\* (B) after the pressure regulator.  
(C) before the pressure regulator.  
(D) before the pilot valve.
2. Who certifies that an “incomplete” straight truck is a “completed vehicle”?  
\* (A) The final stage manufacturer  
(B) The chassis manufacturer  
(C) The intermediate stage manufacturer  
(D) The body manufacturer
3. When installing a van body on a medium or heavy-duty chassis, the front U-bolt should be located:  
(A) as close to the front of the body as possible.  
(B) behind the first crossmember.  
\* (C) no closer than 18 in. (45.7 cm) from the front of the body.  
(D) in front of the first crossmember.
4. An air lift axle raises too slowly. Technician A says that a bad quick release valve could be the cause. Technician B says that poor suspension lubrication could be the cause. Who is right?  
\* (A) A only                      (C) Both A and B  
(B) B only                        (D) Neither A nor B



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## E1 SAMPLE QUESTIONS (CONTINUED)



5. When installing a full channel frame reinforcement on the mild steel chassis frame shown above, the best technique is to:
- \* (A) circular fillet weld the web of the reinforcement to the chassis frame.
  - (B) skip weld around the outside of the reinforcement.
  - (C) MIG weld completely around the outside of the reinforcement.
  - (D) weld the reinforcement to the top and bottom chassis frame flanges.
6. The desired angle of the hanger bearing in relation to the driveshaft should be:
- (A) 1 - 2°
  - (B) 3 - 4°
  - (C) 45°
  - \* (D) 90°

***Question 7 is not like the ones above.***

It has the word EXCEPT. For this question, look for the choice that is NOT a needed dimension. Read the question carefully before choosing your answer

7. Each of these dimensions is needed to determine the required body mount U-bolt length, EXCEPT the:
- (A) frame depth.
  - (B) long sill depth.
  - (C) depth of the spacer.
  - \* (D) depth of the crossmember.



# TEST SPECIFICATIONS AND TASK LIST

## ELECTRICAL/ELECTRONIC SYSTEMS INSTALLATION AND REPAIR (TEST E2)

| Content Area                                     | Questions in Test | Percentage of Test |
|--|-------------------|--------------------|
| A. General Electrical Diagnosis                  | 12                | 24%                |
| B. Battery System                                | 5                 | 10%                |
| C. Auxiliary Electric Power Units                | 9                 | 18%                |
| D. Charging Systems                              | 4                 | 8%                 |
| E. Lighting Systems                              | 9                 | 18%                |
| F. Associated Electrical Circuits and Components | 11                | 22%                |
| <b>Total</b>                                     | <b>50</b>         | <b>100%</b>        |

### A. General Electrical Diagnosis (12 questions)

1. Identify, interpret, and locate circuit components using schematic, circuit, and component locator diagrams.
2. Understand basic electrical/electronic concepts.
3. Check continuity in electrical/electronic circuits using appropriate test equipment.
4. Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using a digital (DVOM/DMM) or analog voltmeter.
5. Check current flow in electrical/electronic circuits and components using an ammeter.
6. Check resistance in electrical/electronic circuits and components using an ohmmeter.
7. Locate and repair shorts, grounds, and opens in electrical/electronic circuits.
8. Diagnose key-off (parasitic) battery drain problems.
9. Install, inspect, test, and replace fusible links, circuit breakers, fuse blocks, and fuses.
10. Install, inspect, test and replace diodes, and printed circuits/control modules.
11. Install, inspect, test, and replace relays and solenoids.
12. Determine correct power connection point or distribution center.

### B. Battery System (5 questions)

1. Perform battery state-of-charge test.
2. Perform battery capacity (load, high-rate discharge) test and determine needed service.
3. Install, inspect, clean, service, or replace battery and terminal connections.
4. Install, inspect, clean, repair, and replace battery boxes, mounts, and hold downs.
5. Charge battery using slow or fast charge method as appropriate.
6. Jump start vehicle using jumper cables and a booster battery or auxiliary power supply.
7. Determine correct auxiliary battery application and location.
8. Install auxiliary battery, diodes, and isolator system.



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## E2 TASK LIST (CONTINUED)

### C. Auxiliary Electric Power Units (9 questions)

1. Perform current draw tests.
2. Perform voltage drop tests.
3. Install, auxiliary AC/DC electric power unit, relays, solenoids, switches, circuit protection devices, wiring, and connectors.
4. Inspect and repair auxiliary AC/DC electric power unit, relays, solenoids, switches, circuit protection devices, wiring, and connectors.

### D. Charging Systems (4 questions)

1. Inspect, adjust, and replace alternator drive belts, pulleys, fans, and mounting brackets.
2. Perform charging system voltage and amperage output tests.
3. Perform charging circuit voltage drop tests; determine needed repairs.
4. Remove and replace alternator; check pulley alignment.
5. Inspect, repair, or replace charging system connectors and wires.

### E. Lighting Systems (7 questions)

1. Diagnose the cause of brighter-than-normal, intermittent, dim, or no lamp operation.
2. Install, test, aim, and replace headlights and auxiliary lighting systems.
3. Test, repair, and replace headlight dimmer switches, wires, connectors, terminals, sockets, relays, and miscellaneous components.
4. Install, inspect, test, repair, or replace switches, bulbs, sockets, connectors, terminals, relays, and wires of parking, clearance, and taillight circuits on trucks and trailers.
5. Install, inspect, test, adjust, repair, or replace stoplight circuit switches, bulbs, sockets, connectors, terminals, relays, and wires.
6. Diagnose the cause of no turn signal and hazard flasher lights or lights with no flash on one or both sides.
7. Inspect, test, repair, or replace turn signal and hazard circuit flasher, switches, bulbs, sockets, connectors, terminals, relays, and wires.
8. Install, inspect, test, adjust, repair, or replace back-up light and warning device circuit switches, bulbs, sockets, horns, buzzers, connectors, terminals, and wires.

### F. Associated Electrical Circuits and Components (10 questions)

1. Install, inspect, test, repair, or replace body builder installed warning devices, interlocks, alarms, switches, relays, connectors, terminals, wires, and printed circuits/control modules.
2. Diagnose the cause of constant, intermittent, or no alarm operation.
3. Install, inspect, test, repair, or replace alarm, interlock, circuit relays, switches, controls, connectors, terminals, and wires.
4. Inspect, test, repair or replace A/C electrical components including electro-magnetic clutches, pump clutches, motors, resistors, relays, switches, controls, connectors, terminals, and wires.
5. Determine power source (chassis interface) provided by original equipment manufacturer (OEM) for auxiliary equipment connections.
6. Install chassis/trailer connection devices. ■

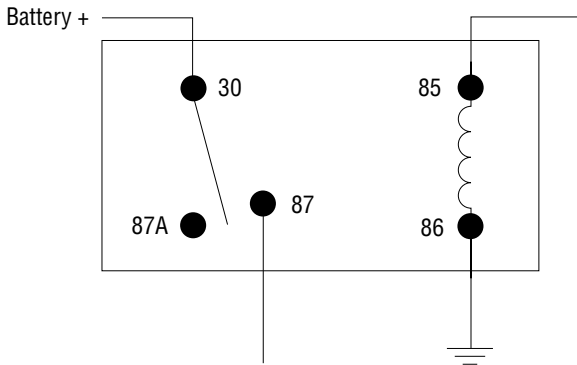


## SAMPLE QUESTIONS

# ELECTRICAL/ELECTRONIC SYSTEMS INSTALLATION AND REPAIR (TEST E2)

### Questions:

1. A bed cap (topper) being installed on a pickup body does not have a center, high-mounted stop lamp (CHMSL). The truck, itself, is equipped with a CHMSL.  
Technician A says that a CHMSL is required if the vehicle gross weight rating is 10,000 lbs or less. Technician B says that CHMSL is required if the vehicle is over 80" (203 cm) wide. Who is right?  
\* (A) A only (C) Both A and B  
(B) B only (D) Neither A nor B
  
2. A technician finds that when the liftgate is operated, there is a 2 volt drop between the liftgate motor and the battery. Which of these could be the cause?  
(A) Low current draw from the motor  
(B) The supply cable gauge is too large  
(C) Low battery state-of-charge  
\* (D) The supply cable gauge is too small



3. At which of the relay terminals shown above would a technician check for a high current load when the relay is energized?  
(A) 85  
(B) 86  
\* (C) 87  
(D) 87A



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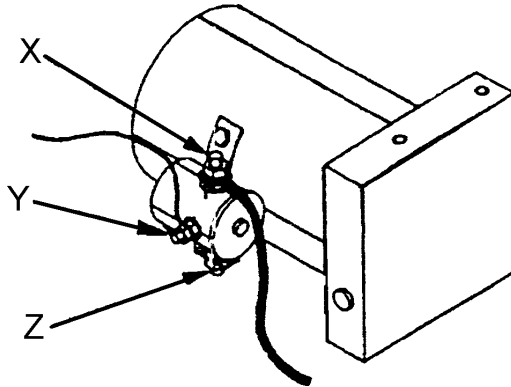
## E2 SAMPLE QUESTIONS (CONTINUED)

4. The “body up” indicator lamp does not function. Technician A says that an open switch could be the cause. Technician B says that a corroded connector could be the cause. Who is right?

(A) A only  
(B) B only  
\* (C) Both A and B  
(D) Neither A nor B

5. When performing a battery capacity (load, high-rate discharge) test on a 900 CCA battery, the load applied should be:

(A) 300 amps.  
\* (B) 450 amps.  
(C) 600 amps.  
(D) 900 amps.



6. The liftgate motor above will not run when the circuit is energized. Battery voltage is present at terminals X and Y. To diagnose the problem, a jumper cable is installed across terminals X and Z. Technician A says that if the motor runs with the jumper cable installed, the motor solenoid could be the cause. Technician B says that if the motor does not run with the jumper cable installed, a bad ground could be the cause. Who is right?

(A) A only  
(B) B only  
\* (C) Both A and B  
(D) Neither A nor B

**Question #7 is not like the ones above.**

It has the word EXCEPT. For this question, look for the choice that is NOT a correct option. Read the question carefully before choosing your answer.

7. Warning lights and buzzers can be switched through any of these EXCEPT a:

(A) power switch.  
(B) grounding switch.  
(C) relay.  
\* (D) diode.

# TEST SPECIFICATIONS AND TASK LIST

## AUXILIARY POWER SYSTEMS INSTALLATION AND REPAIR (TEST E3)

| Content Area                            | Questions in Test | Percentage of Test |
|---|-------------------|--------------------|
| A. Hydraulic Systems                    | 30                | 67%                |
| 1. Pumps (8)                            |                   |                    |
| 2. Filtration/Reservoirs (Tanks) (5)    |                   |                    |
| 3. Hoses, Fittings, and Connections (4) |                   |                    |
| 4. Control Valves (2)                   |                   |                    |
| 5. Actuators (3)                        |                   |                    |
| 6. General System Operation (8)         |                   |                    |
| B. Mechanical Systems                   | 13                | 29%                |
| C. Pneumatic Systems                    | 2                 | 4%                 |
| <b>Total</b>                            | <b>45</b>         | <b>100%</b>        |

### A. Hydraulic Systems (30 questions)

#### 1. Pumps (8 questions)

1. Determine pump type and rotation.
2. Install pump properly to include spline lubrication, brackets/supports, location, driveshaft angles, slip joint location(s), case drain, and hydraulic connections.
3. Diagnose causes of unusual pump noises, temperatures, and flow; determine needed repairs.
4. Verify proper fluid application.

#### 2. Filtration/Reservoirs (Tanks) (5 questions)

1. Identify type of filtration system; verify filter application and flow direction.
2. Install filter(s) in proper locations(s); flush system in accordance with manufacturers' recommendations.
3. Diagnose cause(s) of system contamination.
4. Service filters and breathers in accordance with manufacturers' recommendations.
5. Install reservoirs (tanks), related components, and shut off valves in accordance with recommended procedures; flush and clean as required.

#### 3. Hoses, Fittings, and Connections (4 questions)

1. Identify proper applications to include sizes, types, and pressure/flow ratings.
2. Determine hydraulic layout (length, size, routing, bend radii, and protection).
3. Determine correct application of thread sealants.
4. Assemble hoses, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.



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## E3 TASK LIST (CONTINUED)

5. Diagnose cause of component leakage.

### 4. Control Valves (2 questions)

1. Identify control valves (directional and accessory) application and porting.
2. Install valves in accordance with recommended procedures regarding location, mounting, and shielding; verify flow direction.
3. Verify system operating pressure and flow; confirm component compatibility.
4. Verify, install, and adjust valve controls (electrical, mechanical, and pneumatic).

### 5. Actuators (3 questions)

1. Purge/bleed system in accordance with recommended procedures.
2. Diagnose the cause of incorrect actuator movement; determine needed repair.
3. Diagnose the cause of seal failure; determine needed repair.
4. Verify motor rotation direction.
5. Verify case drain operation (where applicable).
6. Identify cylinder type (single/double acting).

### 6. General System Operation (8 questions)

1. Interpret system diagrams, schematics, and layouts.
2. Identify proper tools for installation, diagnosis, maintenance, and repair.
3. Perform general service diagnosis and repair procedures.
4. Assemble and integrate system components.

## B. Mechanical Systems (13 questions)

1. Verify PTO type, location, and mounting clearance; remove cover and identify PTO drive gear location and type (spur or helical).
2. Install supplied gaskets, verify correct fasteners and locktabs; install PTO, torque to specifications.
3. Remove, where applicable, PTO shifter cover and measure backlash with dial indicator; adjust as needed.
4. Install lubrication line, if required.
5. Install shift controls and fastener lock tabs.
6. Refill transmission to proper lubrication level with transmission manufacturer's recommended lubricant.
7. Test operation of PTO; check for unusual noises and leaks; check shifter operation.
8. Verify proper rotational direction of output shaft.
9. Install all warning and instructional decals/labels.
10. Determine PTO driveshaft length application and operating angles.
11. Install PTO driveshaft; lubricate U-joints and slip joints; check that operating angles are within manufacturers' recommended specifications.
12. Check for proper PTO shaft timing (phasing).
13. Check belt tension and alignment of belt driven components.
14. Diagnose the causes of vibrations in auxiliary power trains.
15. Test operation of PTO speed controls.
16. Install guarding, if required.
17. Diagnose the cause of abnormal PTO/component wear.



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## E3 Task List (CONTINUED)

### C. Pneumatic Systems (2 questions)

1. Determine proper location for pressure protection valve(s); install valve(s), and check operation.
2. Determine proper location for the air activated control valve.
3. Connect DOT specified lines, fittings, and hoses to air activated control valve(s); determine proper routing of air hoses.
4. Verify operation of pressure reducing (air regulator) valve(s). ■

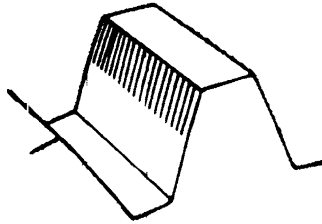
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# SAMPLE QUESTIONS

## AUXILIARY POWER SYSTEMS INSTALLATION AND REPAIR (TEST E3)

### Questions:

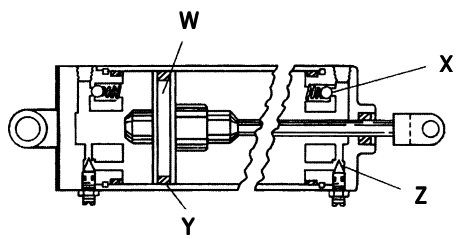
1. Which of these is the correct hydraulic hose to install on the suction side of the hydraulic pump?
  - (A) A one-braided wire hydraulic hose
  - (B) A two-braided wire hydraulic hose
  - \* (C) A one-spiral wire hydraulic hose
  - (D) A two-spiral wire hydraulic hose



2. The gear wear at the shaded area of a gear tooth shown above is caused by:
  - (A) the PTO gear being installed too tight to the transmission gear.
  - \* (B) the PTO gear being installed too far away from the transmission gear.
  - (C) disengaging the PTO under load.
  - (D) engaging the PTO improperly.
3. A cylinder head packing is leaking. Technician A says that nicks on the cylinder rod could be the cause. Technician B says that a rolled over V packing could be the cause. Who is right?
  - (A) A only
  - (B) B only
  - (C) Both A and B
  - \* (D) Neither A nor B
4. A 3-way valve is used with:
  - \* (A) a single acting cylinder.
  - (B) a double acting cylinder.
  - (C) an intensifying cylinder.
  - (D) a snowplow reversing cylinder.



**E3 SAMPLE QUESTIONS (CONTINUED)**



5. In the illustration shown above, which of these is the piston seal?
  - (A) W
  - (B) X
  - \* (C) Y
  - (D) Z
  
6. Technician A says that if the output shaft of a PTO is turning clockwise (enginewise), it will drive a counter clockwise (left hand) pump. Technician B says that if the output shaft of a PTO is turning counter clockwise (opposite engine) it will drive a clockwise (right hand) pump. Who is right?
  - (A) A only
  - (B) B only
  - \* (C) Both A and B
  - (D) Neither A nor B

**Questions 7 and 8 are not like the ones above.**

They contain the words EXCEPT or LEAST. For these questions, look for the choice which is NOT a valid answer to the problem described. Read the question carefully before choosing your answer.

7. A technician is selecting a hydraulic hose to replace a damaged suction hose. All of these should be considered EXCEPT:
  - \* (A) pressure relief setting of the hydraulic system.
  - (B) vacuum rating of the hose.
  - (C) pump flow at the operating rpm.
  - (D) compatibility to the oil in system.
  
8. Small bits and pieces of rubber are found throughout a hydraulic system. Which of these is the LEAST likely source?
  - (A) The inner lining of the hydraulic hoses
  - \* (B) The pump shaft seal
  - (C) The fitting O-rings
  - (D) The valve spool seal





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