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Author & Automotive Expert James D. Halderman

What's new with Jim?

Everything is organized for you!

Coming late summer.
A greatly expanded
and organized
Halderman website.
Some of the
comments from
reviewers include:

- Wow
- Awesome
- Exactly what I need as an instructor
- Can't find this stuff anywhere else

According to the ASE Education Foundation program standards (standard 12), up to 25% of the instructional hours can be met by applicable work-based learning activities, e-learning or a combination through the use of a learning management system (LMS). Check out what is available now, and be pleasantly surprised with the new design coming soon, send Glen, my assistant, an email at glen@jameshalderman.com with your school information and he will give you FREE access for two days so you look around and see if the website will meet your needs.

Where's Jim?

Due to the Coronavirus, all events have been canceled and I have no travel plans planned for the rest of the year.

Keep up with me at:
www.jameshalderman.com
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Puzzle of the month

Find this month's puzzle of the month at this [link](#) and test your students knowledge on magnetism and electromagnetism.

145

Key Off Battery Drain

Meets ASE Task: (A6-A8) P-1 Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine the needed action.

Name _____ Date _____ Time on Task _____

Make/Model/Year _____ VIN _____ Evaluation: 4 3 2 1

A battery electrical drain test should be performed if a battery is dead (discharged) to determine if a battery electrical drain was the cause of the dead battery.

☐ 1. Perform a visual inspection and check if the following are turned on:

- a. The glove box light (instrument panel compartment light)
- b. The interior light switch
- c. Vanity mirror(s) light(s)
- d. Trunk light (look for discoloration indicating that the bulb may have been on for a long time)

☐ 2. Turn the ignition and all accessories off. Close all doors and the trunk. Disconnect the under-the-hood lamp if equipped.

☐ 3. Disconnect the negative (-) battery cable.

☐ 4. Select DC amperes on a digital multimeter.

☐ 5. Connect the black meter lead to the negative terminal of the battery.

☐ 6. Connect the red meter lead to the disconnected cable end and read the ammeter.


_____ amps of battery electrical drain (should be less than 0.05A (50 mA))

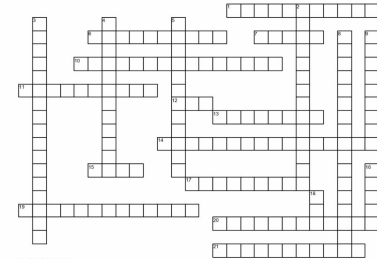
OK ☐ NOT OK ☐

☐ 7. What is the needed action? _____

☐ 8. Reconnect the battery, reset the radio presets, and set the time on the vehicle clock.

HINT: If possible, use a clip-on type digital multimeter or an amp probe to measure the battery drain. Using this equipment prevents the need to disconnect the battery cable and then have to reset the radio and the clock.





ACROSS

- 1 _____ refers to the number of flux lines per unit area.
- 6 Although there is no absolute insulation for magnetism, certain materials resist the passage of magnetic force. Air does not allow permeability, so it has a high _____.
- 7 The opposite ends of a magnet are called its north and south _____.
- 10 _____ means that the separation or collapse of the magnetic field around one coil induces a voltage in the second coil.
- 11 The secondary winding has about 100 times the number of turns of the primary winding, reflects on the _____.
- 12 The negative terminal is attached to an _____ or lighter, which opens and closes the power (ignition) circuit by opening or closing the ground return path of the circuit.
- 13 An induced current moves so that its magnetic field opposes the motion that induced the current, this principle is called _____.
- 14 The interaction and relationship between magnetism and electricity is known as _____.
- 15 The self-induced voltage that opposes changes in current flow is an inductor called _____.

DOWN

- 2 Coils with air core are called _____.
- 3 If the metal removed from the magnetic field, and it retains some magnetism, this is called _____.
- 4 The _____ is a simple way to determine which direction the flux lines go.
- 5 Another name for magnetic lines of force is _____.
- 6 The process of creating a magnet by using a magnetic field is called _____.
- 9 _____ is a form of energy that is caused by the motion of electrons in some materials.
- 16 A _____ is a control device that allows a small amount of current to control a large amount of current in another circuit.
- 18 The abbreviation for electromagnetic interference is _____.

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Auto Trivia

This is the front view of a _____
a. 1953 Chrysler New Yorker
b. 1958 Dual Ghia
c. 1956 Dodge
d. Unknown- Never saw one before

**Answer at the bottom*



FAQ

Should Batteries Be Kept Off of Concrete Floors?

All batteries should be stored in a cool, dry place when not in use. Many technicians have been warned not to store or place a battery on concrete.

According to battery experts, it is the temperature difference between the top and the bottom of the battery that causes a difference in the voltage potential between the top (warmer section) and the bottom (colder section).

It is this difference in temperature that causes self-discharge to occur.

In fact, submarines cycle seawater around their batteries to keep all sections of the battery at the same temperature to help prevent self-discharge.

Therefore, always store or place batteries up off the floor and in a location where the entire battery can be kept at the same temperature, avoiding extreme heat and freezing temperatures. Concrete cannot drain the battery directly because the case of the battery is a very good electrical insulator.

Sample ASE certification-type question

The starter solenoid makes a clicking noise when the ignition key is turned to the start position. A probable cause is _____.

- a. a low battery voltage
- b. a defective hold-in coil in the solenoid
- c. poor connections at the battery
- D. Any of the above

Answer/Explanation

The correct answer is d. All of the above are probable causes of a clicking solenoid, including low battery voltage (answer a), defective hold-in winding coil in the solenoid (answer b), and poor connections at the battery (answer c). Low voltage is the usual cause of a clicking solenoid, and low battery voltage or loose/corroded battery terminals are the most common causes. Answers a, b, and c are not correct because all are correct.

Tech Tip

Programming Auto Down/Up Power Windows

Many vehicles are equipped with automatic operation that can cause the window to go all the way down (or up) if the switch is depressed beyond a certain point or held for a fraction of a second. Sometimes this feature is lost if the battery in the vehicle has been disconnected.

Although this programming procedure can vary depending on the make and model, many times the window(s) can be reprogrammed without using a scan tool by depressing and holding the down button for 10 seconds. If the vehicle is equipped with an auto up feature, repeat the procedure by holding the button up for 10 seconds. Always check exact service information for the vehicle being serviced.



Case Study

Lightning Damage

A radio failed to work in a vehicle that was outside during a thunderstorm. The technician checked the fuses and verified that power was reaching the radio. The technician noticed the antenna. It had been struck by lightning. Obviously, the high voltage from the lightning strike traveled to the radio receiver and damaged the circuits. Both the radio and the antenna were replaced to correct the problem.



Summary:

- **Complaint**—Customer stated that the radio did not work.

- **Cause**—Visual inspection showed an antenna that had been struck by lightning.
- **Correction**—Replacing the radio and the antenna restored proper operation.

Straight Talk

Reader Asks About Electric Cars

From the May 29 Wheels Section of the Dayton Daily News

Wheels:

John D. asks:

“I own a Toyota Prius and love the fuel economy but the high-voltage battery required replacement at about 150,000 miles. While I would consider a totally electric car, I have several concerns that I hope you can address:

- 1. Do I have to plug it in to an electric outlet every day? I really don’t want to have to do this.*
- 2. Does the large battery reduce the space inside the car for passengers and trunk space?*
- 3. How often does the high-voltage battery need to be replaced and what would that cost?*
- 4. Will an electric car cost me more in electricity than it will cost me to purchase gasoline for a conventional car?*

Thanks.”



Halderman:

Thanks for writing and sorry you had to replace the high-voltage battery pack in your Prius. I have known of many hybrid electric vehicles still going strong after 200,000 miles. If the car is used regularly and driven more than short trips every day, the high-voltage battery should last the life of the vehicle.

1. Do you have to plug in electric car every day? The short answer is no. For a typical electric vehicle (EV) that has a range of 200 miles or more, it needs to be plugged into a 220-volt outlet whenever the vehicle indicates that it needs to be charged similar to the fuel gauge in a conventional vehicle. For me that would mean charging overnight once a week.
2. The high-voltage battery is actually many hundreds of smaller battery cells that are underneath the vehicle. As result, the interior is open and often does not include a center “hump” resulting in a very roomy interior. Often there is a storage front trunk (frunk) where the engine would be located in a conventional vehicle.
3. The high-voltage battery should last the life of the vehicle. The batteries used today are cooled and heated using a separate cooling system that keeps the battery at an optimum temperature. It is this heating of cold batteries that reduces the range of an electric vehicle in winter months. Batteries work best at the same temperature that humans like (68 to 78 degrees).
4. No. Charging an electric car is a lot less costly compared to purchasing gasoline. For example, I calculated that it will cost me about \$10 to charge my future electric vehicle that has a 250-mile range. That is at least half of the cost of gasoline to travel over 200 miles.

Have an automotive question? Get a straight answer by writing to Jim at jim@jameshalderman.com



Answer To This Month's Trivia:
B. 1958 Dual Ghia

Contact Us

