

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Instructor: \_\_\_\_\_ Period: \_\_\_\_\_



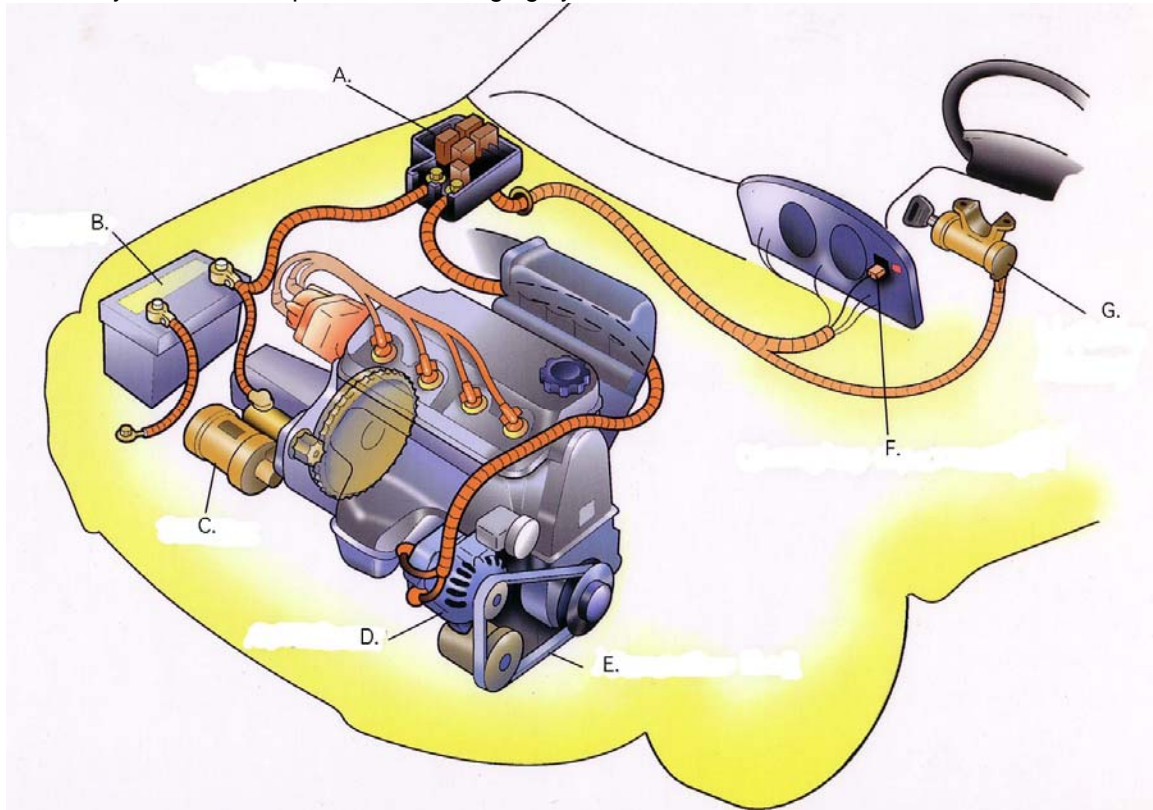
## Charging System Fundamentals



**Objective:** After studying this chapter, you will be able to explain charging system operation.

### Basic Charging System Parts

1. Identify the indicated parts of this charging system



A. \_\_\_\_\_ B. \_\_\_\_\_ C. \_\_\_\_\_ D. \_\_\_\_\_  
 E. \_\_\_\_\_ F. \_\_\_\_\_ G. \_\_\_\_\_

2. Define **Alternator**. \_\_\_\_\_  
 \_\_\_\_\_
3. What is the purpose of the **voltage regulator**? \_\_\_\_\_  
 \_\_\_\_\_
4. The alternator belt is driven by the \_\_\_\_\_.
5. The **charge indicator** informs the driver of charging system \_\_\_\_\_.
6. The **charging system harness**, or the wiring harness, connects the electrical components together into a \_\_\_\_\_.

7. List three (3) functions a battery performs in an automobile:
- A. \_\_\_\_\_
  - B. \_\_\_\_\_
  - C. \_\_\_\_\_

8. Automotive alternators have a **preset charging voltage** of \_\_\_\_\_ volts D.C.

### Charging System Functions

9. List and describe **four(4)** primary functions of a automotive charging system:
- A. \_\_\_\_\_
  - B. \_\_\_\_\_
  - C. \_\_\_\_\_
  - D. \_\_\_\_\_

### Types of Charging Systems

10. An **alternator** or **ac generator**, has several benefits over a **dc generator**. List four benefits of an alternator:
- A. \_\_\_\_\_
  - B. \_\_\_\_\_
  - C. \_\_\_\_\_
  - D. \_\_\_\_\_
11. Alternators are constructed in \_\_\_\_\_ of a dc generator.

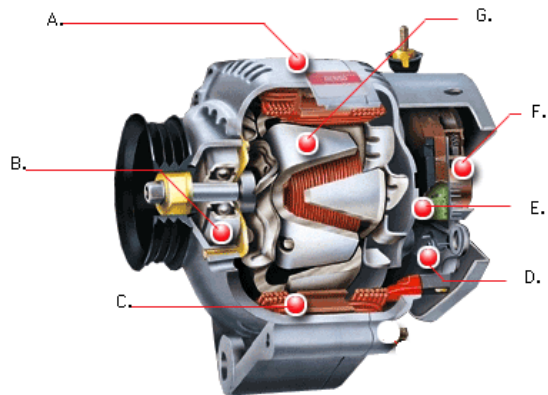
### Alternator Operation

12. **Alternators** are constructed with a \_\_\_\_\_ to convert alternating current (ac) output into direct current (dc) to store in the battery.
13. A **diode** is a type of check valve that allows electrical current to flow in only \_\_\_\_\_.
14. Alternators are constructed with multiple diodes to increase the alternator's \_\_\_\_\_.

### Alternator Construction

15. List the components of an alternator:
- A. \_\_\_\_\_
  - B. \_\_\_\_\_
  - C. \_\_\_\_\_
  - D. \_\_\_\_\_
  - E. \_\_\_\_\_
  - F. \_\_\_\_\_
  - G. \_\_\_\_\_

**Alternator Cutaway**



16. The primary components of an **alternator rotor** are the \_\_\_\_\_ windings and the claw-shaped \_\_\_\_\_.
17. The alternator brushes ride on the \_\_\_\_\_ to make a sliding connection to the rotor.
18. Small coil \_\_\_\_\_ hold the brushes in light, constant contact to the slip rings.
19. List the two types of anti-friction bearings are found in modern alternators:
- A. \_\_\_\_\_
  - B. \_\_\_\_\_

20. Diodes are mounted in **trios**. There are a total of \_\_\_\_\_ diodes in an automotive alternator.
21. The **diode trio** is often used to supply current to the \_\_\_\_\_ windings.
22. An alternator's fan draws air \_\_\_\_\_ and \_\_\_\_\_ the alternator .
23. The primary drive method for an automotive alternator is a \_\_\_\_\_ .
24. A **voltage regulator** controls alternator output by controlling \_\_\_\_\_ flowing through the rotor windings.
25. List the **three (3)** types of automotive voltage regulators:  
 A. \_\_\_\_\_ B. \_\_\_\_\_ C. \_\_\_\_\_
26. An **electronic voltage regulator** uses a **battery thermistor** to measure battery \_\_\_\_\_ to alter charging output accordingly.
27. Modern automotive **powertrain control modules (PCM)** often supplement or even replace the conventional voltage regulator in order to more \_\_\_\_\_ the charging circuit.
28. List three (3) advantages of using the **PCM** to control the charging circuit:  
 A. \_\_\_\_\_  
 B. \_\_\_\_\_  
 C. \_\_\_\_\_
29. The PCM can react to the charging system by switching on and off up to \_\_\_\_\_ times per second.
30. A **fail-safe** circuit will protect the sensitive computer controls by disconnecting the \_\_\_\_\_ if the voltage levels become too high.
31. A **warning-light charge indicator** illuminates when alternator output \_\_\_\_\_ a specified voltage.
32. A defective voltage regulator can cause a battery to \_\_\_\_\_ .

