

STEPPING UP VOLTAGE

4. What three things are needed to produce electricity?

a. _____

b. _____

c. _____

THE PRIMARY CIRCUIT

5. Describe the following terms:

a. Circuit

b. Ground

c. Voltage

d. Current

e. Load

f. Magnetic Field

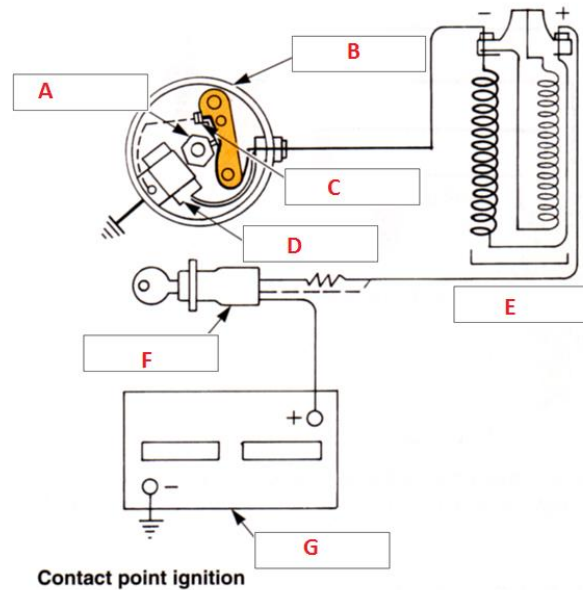
6. We used breaker points for almost 100 years. Why are Breaker Points such a bad idea?

7. (VIDEO QUESTION) Contact Breaker Points (Super Cheap Auto): Describe how to change breaker points:



8. Identify the following components:

- a.
- b.
- c.
- d.
- e.
- f.
- g.



9. What is the purpose of the following parts:
- a. Battery

 - b. Ignition Switch

 - c. Points
10. When Breaker Points open, the small electricity that was going through them wants to keep going and jump the breaker point gap. This erodes the breaker points. What two PARTS are used to help old-fashioned Breaker Points last longer?
- a.

 - b.

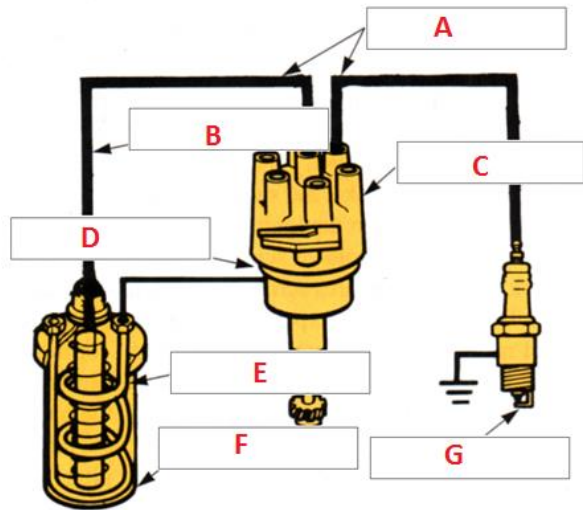
TRIGGERING MECHANISMS

11. How does a Trigger Wheel trigger the Primary Circuit?
12. How does a Hall Effect trigger the Primary Circuit?
13. How does an Optical Pickup trigger the Primary Circuit?

SECONDARY CIRCUIT

14. Identify the following components:

- a.
- b.
- c.
- d.
- e.
- f.
- g.



15. What is the purpose of the Secondary Circuit?

16. Why do engines have a *Firing Order*?

17. What is the purpose of the following parts:

- a. Distributor Cap
- b. Rotor
- c. Spark Plug Wires
- d. Spark Plugs

“Coil Saturation” means the coil has voltage running through it, and the magnetic field around the Primary Windings is as large as possible. MINI-QUIZ TIME!

18. When the points are closed and the coil is saturating, what is happening to the electricity in the primary windings of the coil?
 - a. It is moving
 - b. It is created
 - c. It is collapsing
 - d. It is growing

19. When the points are closed and the coil is saturating, what is happening to the magnetic field around the primary windings of the coil?
 - a. It is moving
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 - d. It is growing

20. When the points are opened, what happens to the magnetic field in the primary windings of the coil?
 - a. It is moving
 - b. It is created
 - c. It is collapsing
 - d. It is growing

21. When the points are opened, what happens to the electricity in the secondary windings of the coil?
 - a. It is moving
 - b. It is created
 - c. It is collapsing
 - d. It is growing

22. A spark plug should only require 5,000 Volts to fire, based on *typical resistance* of the circuit. What are two reasons or causes for requiring MORE voltage? (*what could make it harder to jump the gap?*)
 - a. _____

 - b. _____

OPERATING REQUIREMENTS

Watch My Classroom Lesson: *Ignition System Part 2*

23. Ignition must occur a few degrees BEFORE top dead center. Why?

24. If a distributor rotor is turning clockwise, and I move the breaker point adjusting plate counterclockwise, will the spark occur sooner, or later?
25. A timing light is essentially a strobe light. How does this help us check the base timing?

MECHANICAL ADVANCE

26. What is the purpose of Mechanical Advance?
27. What might cause an engine to require LESS spark advance?
28. (VIDEO QUESTION 1) Spark Advance Mechanisms: (The) Initial setting before TDC allows time for _____ in the cylinder to be developed just as the piston is descending on the power stroke
29. (VIDEO QUESTION 2) As engine speed rises, the _____ on the advance mechanism are thrown outward by centrifugal force. Since cam is able to pivot on the distributor shaft, the weights act against their springs and move the cam _____.
30. (VIDEO QUESTION 3) The load sensitive mechanism, which is operated by _____ via a port on the carburetor or fuel injection throttle body.
31. (VIDEO QUESTION 4) The diaphragm moves against the spring to rotate the _____. Since the base plate carries the contact breaker, the contacts meet the distributor _____ earlier in rotation, advancing the spark.

32. (VIDEO QUESTION) Setting Ignition Timing (Advance Auto Parts): How could you easily check that the Spark Advance system is working?



VACUUM ADVANCE

33. There are two types of Spark Advance - Vacuum Advance and Mechanical Advance. Which one do I want for fuel economy?

34. Describe the level of vacuum in the *manifold* at the following throttle positions:

- a. Closed Throttle

- b. Wide Open Throttle

Manifold Vacuum is not really a vacuum at all – it is just *less than* atmospheric pressure. If we had a sensor that measured manifold vacuum as atmospheric pressure, an *absolute* scale, we would call it a Manifold Absolute Pressure sensor, or a MAP sensor.

35. Describe how to check the vacuum advance system easily

EVOLUTION

36. Manufacturers changed from Point Ignition to Electronic Ignition – what “mechanical” devices were no longer used?

37. Manufacturers changed from Electronic Ignition to Computerized Ignition – what “mechanical” devices were no longer used?

38. Manufacturers changed from Computerized Ignition to Distributorless Ignition – what “mechanical” devices were no longer used?

39. Manufacturers went to Coil On Plug Ignition – what “mechanical” devices were no longer used?

TUNE UP

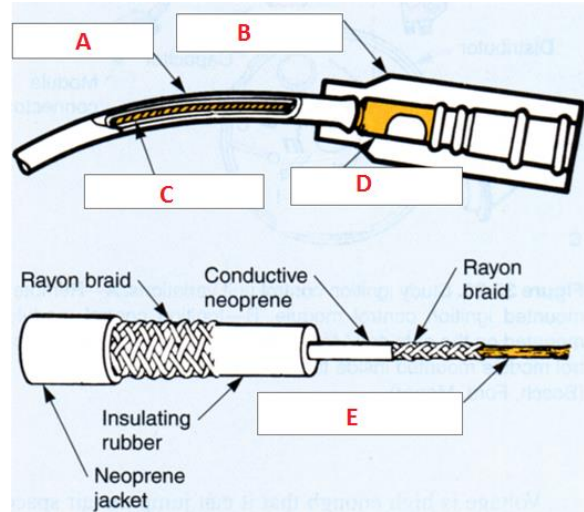
40. How often should the points and condenser be replaced?

41. Rotors and Caps do not last forever. Describe how to tell if the rotor and/or cap needs replacing.

42. A student pressure washes the engine in his vehicle. Now it doesn't run. What will the student need to do to make it run again?

43. Identify the following components:

- a.
- b.
- c.
- d.
- e.



44. What tool do you need to check spark plug wires, and what results are you looking for?

SPARK PLUGS

45. How is a HOT plug constructed differently than a COLD plug?

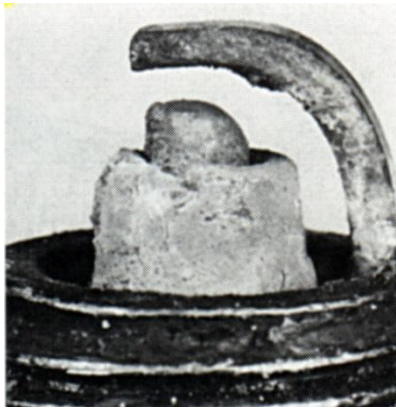
46. Under what circumstances would you want a HOT plug, and why?

47. Describe in your own words the correct procedure for increasing and decreasing a Spark Plug Gap

48. Identify what caused the following spark plug wear:



Black & Sooty



Deposits, no smooth edges



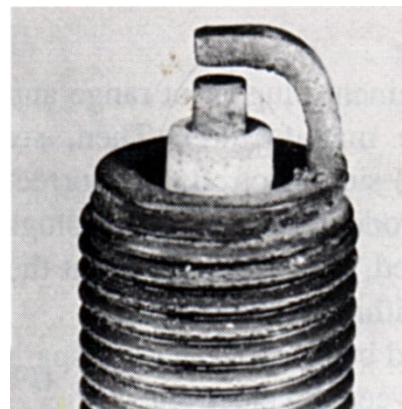
Heavy deposits



Damage, "salt & pepper" deposits



Black & Shiny



Light tan color