Chapter 4
Ignition & Electrical Systems

Chapter 4 - Section A
Study Aid Questions

Fill in the Blanks

1. Ignition systems can be divided into two classifications:_____

systems or _____ systems for reciprocating engines.

2. _____ generally use one rotating magnet that feeds two complete magnetos in one magneto housing.

3. The _____ system is still the most widely used aircraft ignition system.

4. The magneto generates electrical power by the engine rotating the _____ and

inducing a _____to flow in the coil windings.

5. Magneto operation is timed to the _____ so that a spark occurs only when the piston is

on the _____ at a specified number of _____

before the top dead center _____position.

6. The high-tension magneto system can be divided, for purposes of discussion, into 3 distinct circuits:

_____, _____ electrical, and

_____ electrical circuits.

7. The magnetic circuit consists of a permanent multi-pole rotating _____, a _____, and _____.

8. The _____ position produces the maximum number of _____ lines of force.

9. The _____ of the magnet is where one of the poles of the magnet is centered between the pole shoes of the magnetic circuit.

10. Most breaker points used in aircraft ignition systems are of the _____type.

11. The secondary circuit contains the _____of the_____, _____, _____, _____, and _____.

12. When the primary circuit is_____, the current flow through the primary coil produces _____ of force that cut across the secondary windings, inducing an _____force.

13. When the primary circuit current flow is _____, the magnetic field surrounding the primary windings _____.

14. Since most high-tension magnetos have many _____of turns of wire in the _____ coil windings, a very _____ voltage is generated in the _____circuit.

15. _____ in any form is a good conductor of electricity.

True or False

_____ 1. Flashover can lead to carbon tracking, which appears as a fine pencil-like line on the unit across which flashover occurs.

_____ 2. The carbon trail results from the electric spark burning dirt particles that contain moisture.

_____ 3. Good magneto air circulation and ventilation also ensures that corrosive gases produced by normal arcing across the distributor air gap, such as ozone, are carried away.

_____ 4. A magneto is a high frequency radiation emanating (radio wave) device during its operation.

_____ 5. Capacitance is the ability to produce an electrostatic charge between two conducting plates connected by a dielectric.

_____ 6. In a pressurized magneto, the air is allowed to flow through and out of the magneto housing.

_____ 7. The ignition lead directs the electrical energy from the magneto to the spark plug.

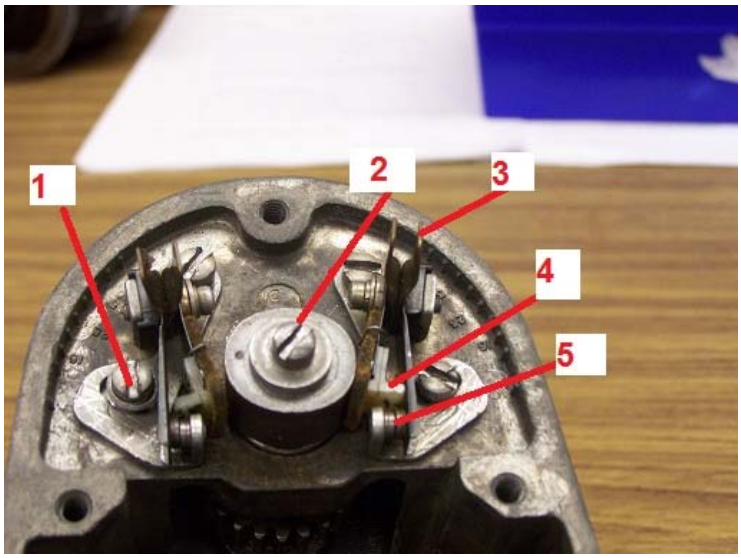
_____ 8. Flange-mounted magnetos are attached to the engine by a flange around the driven end of the rotating shaft of the magneto.

_____ 9. FADEC continuously monitors and controls only the fuel mixture/delivery/injection, as an integrated control system.

_____ 10. All opposed reciprocating engines are equipped with an impulse coupling as the auxiliary starting system.

Matching Questions

Label the components on the following diagram.



1. _____ 2. _____ 3. _____

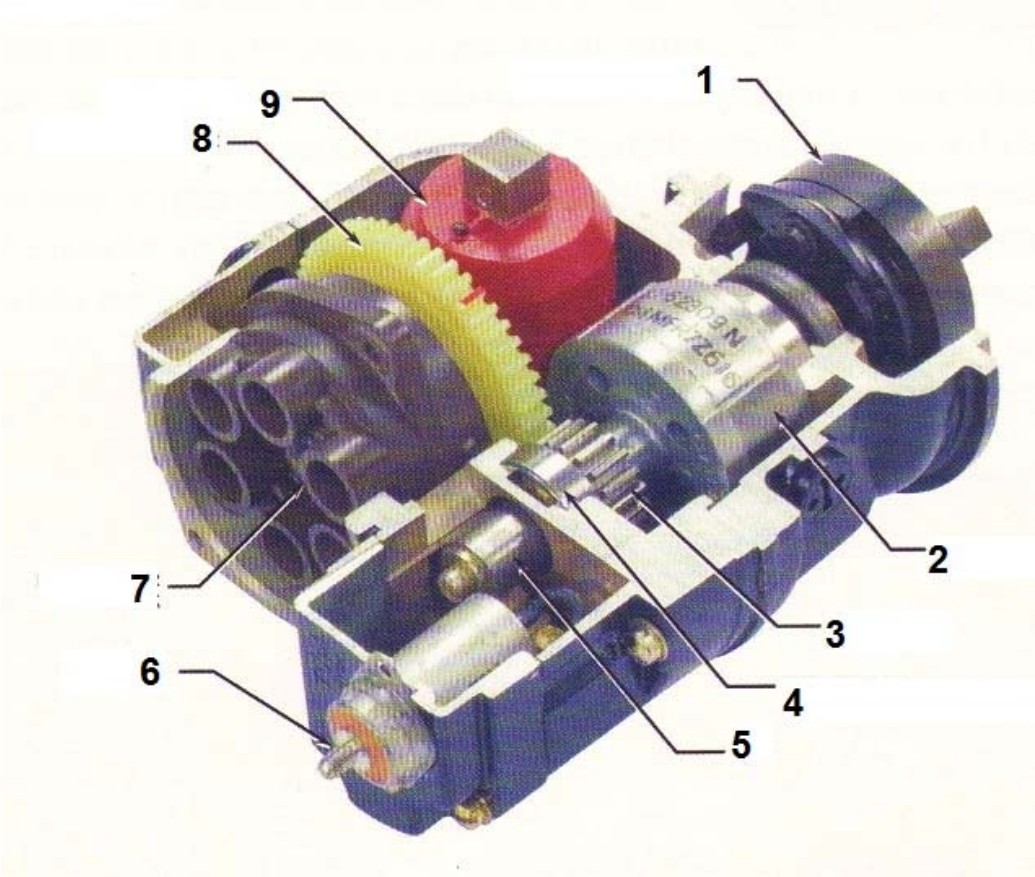
4. _____ 5. _____

Match the number on the diagram with the correct term that describes the item.

_____ High output coil _____ Distributor block _____ Impulse coupling

_____ Pinion gear _____ Magnet _____ Cam

_____ Capacitor _____ Ball bearing _____ Distributor gear



name: _____

Chapter 4 - Section B
Knowledge Application Questions

1. What is the basic function of the starting vibrator and what kind of voltage does it produce?

2. Describe the function of the engines spark plug.

3. Describe the operating conditions that the spark plugs are subjected to during normal operation of the engine.

4. List the three main components of a spark plug.

5. What is the heat range of a spark plug?

6. What is spark plug reach?

7. What problems can occur if the ignition timing is too early?

8. What is meant by the top dead center piston position?

9. Describe the basic process of setting the e-gap of a basic magneto.

10. Describe a magneto check as part of an engine run-up check.

Chapter 4 - Section C

Final Chapter Exam - Ignition and Electrical systems

1. What is the purpose of a power check on a reciprocating engine?
   - a. To check magneto drop
   - b. To determine satisfactory performance
   - c. To determine if the fuel/air mixture is adequate

2. Dual magnetos generally use one rotating magnet that:
   - a. feeds two complete magnetos in one magneto housing
   - b. feeds a complete magneto in two magneto housings
   - c. feeds power to the generator

3. The magneto, a special type of engine-driven alternate current (AC) generator, uses:
   - a. Aircraft electrical system for power
   - b. a permanent magnet as a source of energy
   - c. a special generator that provides power to the magnetos

4. The magneto generates electrical power by the engine rotating the:
   - a. permanent magnet and inducing a current to flow in the coil primary windings
   - b. engine driven generator
   - c. electrical system generator

5. The primary electrical circuit consists of a:
   - a. a permanent multi-pole rotating magnet, a soft iron core, and pole shoes
   - b. windings of the coil, distributor rotor, distributor cap, ignition lead, and spark plug
   - c. set of breaker contact points, a condenser, and an insulated coil

6. The secondary circuit contains the:
   - a. a permanent multi-pole rotating magnet, a soft iron core, and pole shoes
   - b. windings of the coil, distributor rotor, distributor cap, ignition lead, and spark plug
   - c. set of breaker contact points, a condenser, and an insulated coil

7. The magnetic circuit consists of:
   - a. a permanent multi-pole rotating magnet, a soft iron core, and pole shoes
   - b. windings of the coil, distributor rotor, distributor cap, ignition lead, and spark plug
   - c. set of breaker contact points, a condenser, and an insulated coil

8. The component in the primary circuit, the condenser (capacitor), is wired:
   - a. in series with the breaker points
   - b. in parallel with the breaker points
   - c. is not wired to the breaker points

9. Always take timing reading, or stop the propeller movement when setting up an engine for timing:
   - a. in the direction of rotation
   - b. opposite the direction of rotation
   - c. it makes no difference

10. Inspection of ignition leads should include:
- a. visual only
- b. electrical only
- c. a visual and an electrical test

11. A spark plug is considered fouled:
- a. if it has stopped allowing the spark to bridge the gap either completely of intermittently
- b. if it is cover with oil
- c. if it is covered with carbon

12. During the sparking of a spark plug the spark carries with it a portion of the electrode, part of which is:
- a. deposited on the other electrode.
- b. Some of the electrode is blown off in the combustion chamber.
- c. both answers A&B

13. The gap setting should be checked with:
- a. micrometer
- b. l· round wire thickness gauge
- c. l· flatttyLJe thλc⌋nŜss gauge

14. The normal breaker contact surface has:
- a. a dull gray, sandblasted, almost rough appearance over the area where electrical contact is made
- b. well-defined peaks extending noticeably above the surrounding surface
- c. deep pits in the surrounding surface

15. The most common and difficult high-tension ignition system faults to detect are:
- a. high-voltage leaks
- b. low-voltage leaks
- c. magnetic problems

name: _____