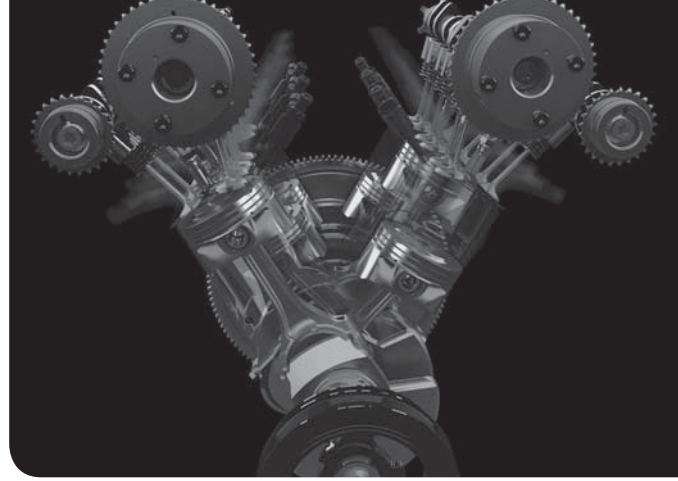


# Chapter 11

## Engine Fundamentals



Name \_\_\_\_\_

Date \_\_\_\_\_

Instructor \_\_\_\_\_

Score \_\_\_\_\_

**Objective:** After studying this chapter, you will be able to explain the basic operation and construction of a typical automotive engine.

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### Engine Operation

1. Why is an automotive engine called a *power plant*?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. The \_\_\_\_\_ is the hollow area between the top of the piston and the bottom of the cylinder head.

3. How does an engine convert fuel into a useful form of energy?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Piston \_\_\_\_\_ is the distance the piston slides up or down from TDC/BDC.

5. Name the four strokes of an automotive engine.

\_\_\_\_\_  
\_\_\_\_\_

6. The crankshaft must rotate \_\_\_\_\_ complete revolutions to complete the four-stroke cycle.

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### Engine Bottom End

7. The engine \_\_\_\_\_ forms the main body of the engine.

8. The \_\_\_\_\_ are large, round holes machined through the block from top to bottom.

9. Define *deck surface*.

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10. \_\_\_\_\_ are coolant passages through the block that allow a solution of water and antifreeze to cool the cylinders.

11. The \_\_\_\_\_ are holes machined in the bottom of the block to hold the crankshaft.

12. \_\_\_\_\_ bolt to the bottom of the block and hold the crankshaft and main bearing inserts in place.

13. The \_\_\_\_\_ changes the up-and-down motion of the pistons into a rotating motion.

14. What is the purpose of crankshaft counterweights?

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15. The \_\_\_\_\_ provides a mounting place for the camshaft drive mechanism, front damper, and fan belt pulleys.

16. What is the function of the crankshaft flange?

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17. Engine main bearings are inserts that fit between the block main bore and crankshaft \_\_\_\_\_.

18. A main \_\_\_\_\_ limits the distance the crankshaft can slide forward or rearward in the block.

19. What is main bearing clearance?

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20. An engine's rear main \_\_\_\_\_ can be a one- or two-piece seal.

21. List three functions of an engine flywheel.

(1) \_\_\_\_\_

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(2) \_\_\_\_\_

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(3) \_\_\_\_\_

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Name \_\_\_\_\_

22. The connecting rod transfers piston \_\_\_\_ and combustion pressure to the crankshaft \_\_\_\_.

\_\_\_\_\_

\_\_\_\_\_

23. \_\_\_\_ clearance is the small space between the rod bearing and crankshaft journal.

\_\_\_\_\_

24. Describe the purpose of an engine piston.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

25. Name six parts of an engine piston.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

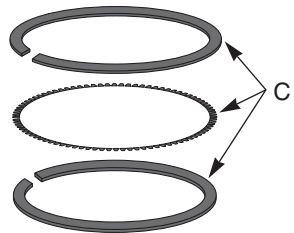
26. Identify the parts of the engine piston illustrated below.



(A) \_\_\_\_\_

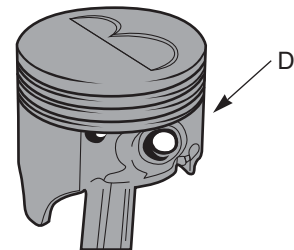


(B) \_\_\_\_\_



(C) \_\_\_\_\_

(D) \_\_\_\_\_



27. Piston \_\_\_\_ must keep combustion pressure from entering the crankcase and must also keep \_\_\_\_ out of the combustion chamber.

\_\_\_\_\_

\_\_\_\_\_

28. Name the two types of piston rings and explain the function of each.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

29. The split between the ends of a piston ring is called \_\_\_\_\_. \_\_\_\_\_

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## Engine Top End

30. What is engine top end?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

31. \_\_\_\_\_ are small pockets formed in the cylinder heads. \_\_\_\_\_

32. The \_\_\_\_\_ route air or air and fuel into the combustion chambers. \_\_\_\_\_

33. What components normally make up an engine valve train?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

34. Describe the function of the engine valve train.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

35. Where is an engine camshaft normally located?  
\_\_\_\_\_  
\_\_\_\_\_

36. A(n) \_\_\_\_\_ usually rides on the cam lobes and transfers motion to the rest of the valve train. \_\_\_\_\_

37. \_\_\_\_\_ transfer motion between the lifters and the rocker arms. \_\_\_\_\_

38. Which is usually larger, the intake valve or the exhaust valve?  
\_\_\_\_\_

39. Define *valve face*.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

40. The valve \_\_\_\_\_ is a long shaft extending out of the valve head. \_\_\_\_\_

Name \_\_\_\_\_

41. Explain the function of valve seals.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

42. On late-model engines, the fuel injectors and the throttle body mount on the \_\_\_\_\_ manifold.

43. Explain the function of an exhaust manifold.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

44. The \_\_\_\_\_ cover is a thin metal or plastic cover over the top of the cylinder head.

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## Engine Front End

45. What parts are attached to the engine front end?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

46. A(n) \_\_\_\_\_ is needed to turn the camshaft at one-half engine speed.

47. Explain the purpose of an automotive engine's crank damper.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_