1. T F Excessive oil consumption can be caused by oil leaks, worn valve stem seals, and a clogged PCV system.
2. T F Torque to yield bolts are very strong and are expected to last for two or three engine rebuilds.
3. T F Torque plates should be used when cylinders are being bored over .030”.
4. T F A clogged (restricted) exhaust would be indicated on a vacuum gauge as a drop in engine vacuum if the engine speed is held at 2,000 to 2,500 RPM.
5. T F A cross-flow head is a design that uses the intake manifold on one side of the engine and the exhaust manifold on the opposite side of the cylinder head.
6. T F When grinding valves with a valve grinder, the final step is to chamfer the tip of the valve.
7. T F During a valve job, an interference angle is typically 10 degrees.
8. T F Valve spring inserts (shims) are used to restore original valve spring tension after grinding valve seats and the face of the valve.
9. T F Pistons are cam ground when manufactured and the piston becomes round at operating temperatures.
10. T F Variable valve timing is used to improve engine power and/or reduce exhaust emission.

1. Technician A says that the paper test could detect a burned valve. Technician B says that a grayish white stain on the engine could be a coolant leak. Which technician is correct?
   1. Technician A only
   2. Technician B only
   3. Both Technicians A and B
   4. Neither Technician A nor B
2. Two technicians are discussing oil leaks. Technician A says that an oil leak can be found using a fluorescent dye in the oil with a black light to check for leaks. Technician B says that a white spray powder can be used to locate oil leaks. Which technician is correct?
   1. Technician A only
   2. Technician B only
   3. Both Technicians A and B
   4. Neither Technician A nor B
3. Which of the following is the least likely to cause an engine noise?
   1. Carbon on the pistons
   2. Cracked exhaust manifold
   3. Loose accessory drive belt
   4. Vacuum leak
4. A smoothly operating engine depends on \_\_\_\_\_\_\_\_\_.
   1. High compression on most cylinders
   2. Equal compression between cylinders
   3. Cylinder compression levels above 100 psi (700 kPa) and within 70 psi (500 kPa) of each other
   4. Compression levels below 100 psi (700 kPa) on most cylinders
5. A good reading for a cylinder leakage test would be \_\_\_\_\_\_\_\_.
   1. Within 20% between cylinders
   2. All cylinders below 20% leakage
   3. All cylinders above 20% leakage
   4. All cylinders above 70% leakage and within 7% of each other
6. Technician A says that during a power balance test, the cylinder that causes the biggest RPM drop is the weak cylinder. Technician B says that if one spark plug wire is grounded out and the engine speed does not drop, a weak or dead cylinder is indicated. Which technician is correct?
   1. Technician A only
   2. Technician B only
   3. Both Technicians A and B
   4. Neither Technician A nor B
7. Cranking vacuum should be \_\_\_\_\_\_\_\_.
   1. 2.5 inches Hg or higher
   2. Over 25 inches Hg
   3. 17 to 21 inches Hg
   4. 6 to 16 inches Hg
8. Technician A says that a leaking head gasket can be checked using a chemical tester. Technician B says that a leaking head gasket can be found using an exhaust analyzer. Which technician is correct?
   1. Technician A only
   2. Technician B only
   3. Both Technicians A and B
   4. Neither Technician A nor B
9. The low oil pressure warning light usually comes on \_\_\_\_\_\_\_\_.
10. Whenever an oil change is required
11. Whenever oil pressure drops dangerously low (4 to 7 psi)
12. Whenever the oil filter bypass valve opens
13. Whenever the oil filter antidrainback valve opens
14. Cylinder heads with four valves flow more air than those with two valves because \_\_\_\_\_\_\_\_.
    1. They have a greater open area.
    2. Use a higher lift camshaft
    3. Increase the velocity of the air
    4. Both A and C
15. Two technicians are discussing a Hemi engine. Technician A says that a Hemi is an engine with a hemispherical-shaped combustion chamber. Technician B says that all Hemi engines are cam-in-block designs. Which technician is correct?
    1. Technician A only
    2. Technician B only
    3. Both Technicians A and B
    4. Neither Technician A nor B

22. Technician A says that an Audi five-valve engine uses three intake valves and two exhaust valves. Technician B says that it uses three exhaust valves and two intake valves. Which technician is correct?

* 1. Technician A only
  2. Technician B only
  3. Both Technicians A and B
  4. Neither Technician A nor B

23. The gasket surface of a cylinder head, as measured with a precision straightedge, should have a maximum variation of \_\_\_\_\_\_\_\_.

1. 0.002 inch in any 6-inch length or 0.004 inch overall
2. 0.001 inch in any 6-inch length or 0.004 inch overall
3. 0.020 inch in any 10-inch length or 0.020 inch overall
4. 0.004 inch in any 10-inch length or 0.008 inch overall

24. Some vehicle manufacturers recommend repairing integral guides using \_\_\_\_\_\_\_\_.

1. OS stem valves
2. Knurling
3. Replacement valve guides
4. Valve guide inserts

25. Typical valve stem-to-valve guide clearance is \_\_\_\_\_\_\_\_.

1. 0.030 to 0.045 inch (0.8 to 1.0 millimeter)
2. 0.015 to 0.020 inch (0.4 to 0.5 millimeter)
3. 0.005 to 0.010 inch (0.13 to 0.25 millimeter)
4. 0.001 to 0.004 inch (0.03 to 0.05 millimeter)

26. Which type of valve guide is most used in a cast iron head?

1. Integral
2. Bronze
3. Powdered metal (PM)
4. Thin wall sleeve type

27. In a normally operating engine, intake and exhaust valves are opened by a cam and closed by the \_\_\_\_\_\_\_\_.

1. Rocker arms or cam follower
2. Valve spring
3. Lifters (tappets)
4. Valve guide and/or pushrod

28. A valve should be discarded if the margin is less than \_\_\_\_\_ after refacing.

1. 0.001 inch
2. 0.006 inch
3. 0.030 inch
4. Manufacturer’s specifications

29. Valve spring inserts (shims) are designed to \_\_\_\_\_\_\_\_\_\_.

1. Increase installed height of the valve
2. Decrease installed height of the valve
3. Adjust the correct valve spring installed height
4. Decrease valve spring pressure to compensate for decreased installed height

30. The proper relationship between intake and exhaust valve diameter is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Intake valve size is 85% of exhaust valve size
2. Exhaust valve size is 85% of intake valve size
3. Exhaust valve size is 38% of intake valve size
4. Intake valve size is 45% of exhaust valve size

31. Dampers (damper springs) are used inside some valve springs to \_\_\_\_\_\_\_\_.

1. Prevent valve spring vibration
2. Keep the valve spring attached to the valve
3. Decrease valve spring pressure
4. Retain valve stem seals

32. Umbrella-type valve stem seals \_\_\_\_\_\_\_\_.

1. Fit tightly onto the valve guide
2. Fit on the valve face to prevent combustion leaks
3. Fit tightly onto the valve stem
4. Lock under the valve retainer

33. The camshaft makes \_\_\_\_\_ for every revolution of the crankshaft.

1. One-quarter revolution
2. One-half revolution
3. One revolution
4. Two revolutions

34. Flat-bottom valve lifters rotate during operation because of the \_\_\_\_\_ of the camshaft.

1. Taper of the lobe
2. Thrust plate
3. Chain tensioner
4. Bearings

35. If lift and duration remain constant and the lobe center angle decreases \_\_\_\_\_\_\_\_.

1. The valve overlap decreases
2. The effective lift increases
3. The effective duration increases
4. The valve overlap increases

36. Two technicians are discussing variable valve timing. Technician A says that changing the exhaust valve timing helps reduce exhaust emissions. Technician B says that changing the intake valve timing helps increase low-speed torque. Which technician is correct?

1. Technician A only
2. Technician B only
3. Both Technicians A and B
4. Neither Technician A nor B

37. A DOHC V-6 has how many camshafts?

1. 4
2. 3
3. 2
4. 1

38. Hydraulic valve lifters can make a ticking noise when the engine is running if \_\_\_\_\_\_\_\_.

1. The valve lash is too close
2. The valve lash is too loose
3. The lobe centerline is over 110
4. Both a and c

39. Hydraulic lifters or hydraulic lash adjusters (HLA) may not bleed down properly and cause an engine miss if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. The engine oil is one quart low
2. The wrong API-rated engine oil is used
3. The wrong SAE-rated engine oil is used
4. Both a and b

40. A hypereutectic piston \_\_\_\_\_\_.

1. Uses about 16% silicon
2. Is a cast piston
3. Is a forged piston
4. Both a and b

41. Many aluminum piston skirts are plated with \_\_\_\_\_\_\_\_.

1. Moly graphite
2. Lead
3. Antimony
4. Ternplate

42. A hypereutectic piston has a higher \_\_\_\_\_\_\_\_.

1. Weight than an aluminum piston
2. Silicon content
3. Tin content
4. Nickel content

43. The purpose of casting steel struts into an aluminum piston is to\_\_\_\_\_\_\_\_.

1. Provide increased strength
2. Provide increased weight at the top part of the piston where it is needed for stability
3. Control thermal expansion
4. Both a and c

44. Full-floating piston pins are retained by \_\_\_\_\_\_\_\_.

1. Lock rings
2. A drilled hole with roll pin
3. An interference fit between rod and piston pin
4. An interference fit between piston and piston pin

45. The space behind the ring is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Side clearance
2. Forward clearance
3. Back clearance
4. Piston ring clearance

46. A misaligned connecting rod causes what type of engine wear?

1. Cylinder taper
2. Barrel-shaped cylinders
3. Ridge wear
4. Diagonal wear on the piston skirt

47. Side clearance is a measure taken between the \_\_\_\_\_ and the \_\_\_\_\_.

1. Piston (side skirt); cylinder wall
2. Piston pin; piston pin retainer (clip)
3. Piston ring; piston ring groove
4. Compression ring; oil control ring

48. Piston ring gap should only be measured after \_\_\_\_\_\_\_\_.

1. All cylinder work has been performed
2. Installing the piston in the cylinder
3. Installing the rings on the piston
4. Both a and c

49. Which type of connecting rod needs to be heated to install the piston pin?

1. Forged
2. b. Interference fit
3. Floating
4. PM rods

50. Two technicians are discussing roller camshafts. Technician says that they reduce friction and wear. Technician B states that they increase economy and performance. Who is correct?

* 1. Technician A only
  2. Technician B only
  3. Both Technician A and B
  4. Neither A nor B