



## (A1) Engine Repair Sample Questions and Answers

Answers to these questions are found beginning on page 4 of this document

1. An engine is misfiring. A power balance test indicates that when the spark to cylinder #4 is grounded, there is no change in the engine speed. Technician A says that a burned valve is a possible cause. Technician B says that a defective cylinder #4 injector or spark plug wire could be the cause. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
2. Two technicians are discussing how to perform a road test to verify the customer's concerns about noise from the engine. Technician A says that the owner should drive and the technician ride along to verify the problem. Technician B says that the vehicle should be driven next to a building to better hear engine noise as it bounces off the walls. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
3. A cylinder leakage (leak-down) test indicates 30% leakage, and air is heard coming out of the air inlet. Technician A says that this is a normal reading for a slightly worn engine. Technician B says that one or more intake valves are defective. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
4. Two technicians are diagnosing a problem with an OHV V-8 with flat-bottom lifters. The rocker covers have been removed and the engine is running. One pushrod is not rotating. Technician A says that the camshaft is worn and must be replaced. Technician B says that the lifter is worn and must be replaced. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B

5. Two technicians are discussing the cause of low oil pressure. Technician A says that a worn oil pump could be the cause. Technician B says that worn main or rod bearings could be the cause. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
6. Cleaning chemicals are usually either a caustic material or an acid material. Which of the following statements is true?
- Both caustics and acids have a pH of 7 if rated according to distilled water.
  - An acid is lower than 7 and a caustic is higher than 7 on the pH scale.
  - An acid is higher than 7 and a caustic is lower than 7 on the pH scale.
  - Pure water is a 1 and a strong acid is a 14 on the pH scale.
7. Pushrods should be checked for \_\_\_\_\_.
- Length
  - Straightness
  - Diameter
  - All of the above
8. Which statement is true about surface finish?
- Cast-iron surfaces should be smoother than aluminum surfaces.
  - The rougher the surface is, the higher the micro inch finish measurement.
  - The smoother the surface is, the higher the micro inch finish measurement.
  - A cylinder head should be a lot smoother than a crankshaft journal.
9. Two technicians are discussing torquing cylinder head bolts. Technician A says that many engine manufacturers recommend replacing the head bolts after their first use. Technician B says that many manufacturers recommend tightening the head bolts to a specific torque, then turning the bolts an additional number of degrees. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B

10. Technician A says that a dial indicator (gauge) is often used to measure valve guide wear by measuring the amount by which the valve head is able to move in the guide. Technician B says that a ball gauge can be used to measure the valve guide. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
11. Coolant passages in the cylinder head should be inspected for \_\_\_\_\_.
- Corrosion
  - Restrictions (blockages)
  - Leakage
  - All of the above
12. Technician A says that the fluorescent penetrant test method can be used to detect cracks in iron, steel, or aluminum parts. Technician B says that the dye penetrant test can only be used with aluminum parts. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
13. The ridge at the top of the cylinder \_\_\_\_\_.
- Is caused by wear at the top of the cylinder by the rings
  - Represents a failure of the top piston ring to correctly seal against the cylinder wall
  - Should not be removed before removing pistons except when reboring the cylinders
  - Means that a crankshaft with an incorrect stroke was installed in the engine
14. A worn piston pin causes what type of problem?
- Engine burns an excessive amount of oil (blue smoke)
  - Engine produces a knocking noise that will disappear if the cylinder is grounded out
  - Engine produces a double knocking noise that will not disappear if the cylinder is grounded out
  - Engine knock when warm only
15. If the bell housing is not properly torqued to the engine block, \_\_\_\_\_.
- The bell housing will distort
  - The engine block will crack
  - The rear cylinder can be distorted (become out-of-round)
  - The crankshaft will crack

## Answers to Sample Questions

1. **The correct answer is c.** Both technicians are correct. Technician A is correct because a burned valve will cause the cylinder to produce less than normal power. Technician B is correct because a fault in either the injector or the spark plug wire can cause the cylinder to misfire. Answers a, b, and d are not correct because both technicians are correct.
2. **The correct answer is c.** The correct answer is that both Technicians A and B are correct. Technician A is correct because the customer can more easily drive the vehicle under the exact conditions, such as speed and throttle position, to create the noise concern. The technician can also concentrate on listening for the noise without having to worry about traffic conditions. Technician B is also correct because noise from the vehicle would tend to bounce off walls or buildings making engine noise easier to hear. Answers a, b, and d are not correct because both technicians are correct.
3. **The correct answer is b.** Technician B is correct. A leakage of 30% is excessive and if air is heard escaping from the engine air inlet, then one or more intake valves must be leaking. It is also possible that the cylinder being tested is not at TDC on the compression stroke. If the cylinder were at TDC of the exhaust stroke, both intake and exhaust valves would be open and air would also be heard coming from the tailpipe. Technician A is not correct because 30% leakage is too much for a slightly worn engine. Leakage should not exceed 20%. Answers c and d are not correct because only Technician B is correct.
4. **The correct answer is c.** Both technicians are correct. Technician A is correct because it is the slight angle on the cam lobe that helps create a rotating force on flat-bottomed lifters. If the lobe is worn, the lifter and the pushrod will not rotate. Technician B is also correct because the bottom of a lifter is slightly convex which helps rotate the lifter as it rides over the cam lobe. If the bottom of the lifter is worn, it will not rotate. Answers a, b, and d are not correct because both technicians are correct.
5. **The correct answer is c.** Both technicians are correct. Technician A is correct because a worn oil pump can cause low oil pressure. An oil pump wears because it is the only engine part that operates on unfiltered oil. Technician B is correct because worn bearings allow an excessive amount of oil to escape and return to the oil pan resulting in a drop in oil pressure. Answers a, b, and d are not correct because both technicians are correct.
6. **The correct answer is b.** Pure water is a 7 on the pH scale with acids represented by numbers lower than 7 and caustic materials (bases) represented by numbers higher than 7. Answers a, c, and d are not correct because these statements do not correctly represent the pH scale.
7. **The correct answer is b.** Most vehicle manufacturers specify that warpage and out of straightness of less than 0.002 in. The best way to determine if the pushrods are straight is to roll them on a flat surface and check for any light under the pushrod as it is rolled. Answer a is not correct because the length would be affected if bent and are different length for different cylinders or valves in some engines. Answer c is not correct because the diameter is determined by the vehicle manufacturer and does not change with use. Answer d is not correct because only answer b is correct.

8. **The correct answer is b.** The higher the micro inch finish measurement, the rougher the surface. For example, a surface finish of 90 micro-inches ( $\pm$  in.) is rougher than a surface that measures  $30 \pm$  in. Answer a is not correct because an aluminum surface should be slightly smoother than a cast iron surface although the specifications are often close. Answer c is not correct because a smooth surface has a lower micro inch finish measurement. Answer d is not correct because a crankshaft journal is smoother than a cylinder head surface.
9. **The correct answer is c.** Both technicians are correct. Technician A is correct because many vehicle manufacturers recommend replacing the head bolts after use because they are stretched during use and cannot be reused. Technician B is correct because many vehicle manufacturers recommend an initial torque setting, and then turning the fasteners additional degrees. This is called torque-angle or torque-to-yield method. Answers a, b, and d are not correct because both technicians are correct.
10. **The correct answer is c.** Both technicians are correct. Technician A is correct because some vehicle manufacturers specify that the valve be opened a certain distance and the play in the guide be measured at the edge of the head of the valve using a dial indicator. Technician B is correct because a ball gauge (small hole gauge) can be used to measure the inside diameter of the guide. The ball gauge is then measured with a micrometer. Answers a, b, and d are not correct because both technicians are correct.
11. **The correct answer is d.** The correct answer is all of the above. The coolant passages in the cylinder head should be inspected for corrosion, restriction, blocking, or signs of leakage. Answers a, b, and c are not correct because all of the items listed should be checked.
12. **The correct answer is a.** Technician A only is correct because fluorescent dye can be used on aluminum or iron parts to check for cracks. Technician B is not correct because even though it is commonly used to check aluminum parts, dye penetrant testing can also be used on iron parts. Answers c and d are not correct because only Technician A is correct.
13. **The correct answer is a.** The ridge is the untouched area (original diameter of the cylinder) above where the piston rings contact the sides of the cylinder. Answer b is not correct because the top piston ring has been contacting the cylinder wall. Answer c is not correct because the ridge should be removed before removing the piston to avoid damage to the pistons. Answer d is not correct because the ridge is normal wear due to the piston ring and does not indicate that the stroke of the crankshaft is not correct.
14. **The correct answer is c.** A worn piston pin will cause a double knock sound. The first sound occurs when the piston stops at top dead center and the second sound occurs as the piston is pulled downward by the connecting rod after top dead center. Answer a is not correct because piston rings and valve stem seals are used to control oil consumption. Answer b is not correct because unlike a rod bearing, the noise of a piston pin does not stop when the cylinder is grounded out. Answer d is not correct because it often occurs when the engine is cold.
15. **The correct answer is c.** The rear cylinder(s) can become distorted if the bell housing bolts are not properly torqued. Answer a is not correct because, even though it may be possible to distort the bell housing, the most correct and most important reason for torquing the bell housing is to prevent distortion of the block. Answer b is not correct because while cracking the block may be possible, it is very unlikely to occur. Answer d is not correct because the crankshaft is not affected when the bell housing is being attached to the back of the engine block.