Light Vehicle Diesel Engines, 1st Edition
Chapter 3

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) What are the steps needed to check valve springs?

2) Why do exhaust valve seats operate cooler in an aluminum cylinder compared to a cast iron cylinder head?

3) What is the purpose and function of valve bridges (crossheads)?

4) How is a two-material valve constructed?

5) How does a hydraulic lifter work?

1) Valve springs are checked for the following:
   1. Free height (or length) without being compressed should be within 1/16 (0.06) inch of specifications
   2. Pressure with valve closed, and height as per specifications
   3. Pressure with valve open, and height as per specifications
   Most specifications allow for variations of plus or minus 10% from the published figures.
   Page Ref: 29-30
2) The exhaust valve seat runs as much as 180°F (100°C) cooler in aluminum heads than in cast iron heads, because aluminum conducts heat faster than cast iron. Insert seats are also used to recondition integral valve seats that have been badly damaged.
   Page Ref: 29
3) Bridges, also called crossheads, are similar to rocker arms and are used in many diesel engines to span two valves from one pushrod.
   Page Ref: 33
4) Some exhaust valves are manufactured from two different materials when a one-piece design cannot meet the desired hardness and corrosion resistance specifications. The joint cannot be seen after valves have been used. The valve heads are made from special alloys that can operate at high temperatures, have physical strength, resist lead oxide corrosion, and have indentation resistance. These heads are welded to stems that have good wear resistance properties. These types of valves are usually welded together using a process called inertia friction welding.
   Page Ref: 28
5) A hydraulic lifter consists primarily of a hollow cylinder body enclosing a closely fit hollow plunger, a check valve, and a pushrod cup. Lifters that feed oil up through the pushrod have a metering disc or a restrictor valve located under the pushrod cup. Engine oil under pressure is fed through an engine passage to the exterior lifter body. An undercut portion allows the oil under pressure to surround the lifter body. Oil under pressure goes through holes in the undercut section into the center of the plunger. From there it goes down through the check valve to a clearance space between the bottom of the plunger and the interior bottom of the lifter body. It fills this space with oil at engine pressure. Slight leakage allowance is designed into the lifter so the air can bleed out, and the lifter can leak down.
   Page Ref: 34-35