Automotive Heating and Air-Conditioning Systems, 8th Edition
Chapter 5

Name_____

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

1) What components are often included as part of a cooling module?

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2) Why does refrigerant oil need to be added to a new component such as a condenser?

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3) What is the difference between a switch and a sensor?

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4) What are the advantages and disadvantages of an orifice tube system?

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5) Why is a sub-cooling necessary in some condensers?

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6) What are the advantages and disadvantages of a thermal expansion valve system?

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7) What is the difference between an accumulator and a receiver-drier?

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1) On most vehicles, the condenser is part of a cooling module that can combine the following:
   - Condenser
   - Radiator
   - Automatic transmission fluid cooler
   - Power steering pump oil coolers
   - An intercooler for engine intake air on turbocharged engines

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2) Removal of an accumulator, condenser, evaporator, or receiver–drier also removes a certain amount of oil from the system, and new oil should be added to the new part. The actual amount is usually specified in service information.
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3) Sensors are thermistors and transducers and these provide a variable output instead of just being on or off like a switch.
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4) The advantages of an orifice tube system over a TXV system include:
   1. An orifice tube system is much simpler and cheaper to produce than a TXV system.
   2. In an orifice tube system, the only moving part in the system is the A/C compressor.

   The disadvantages of an orifice tube system over a TXV system include:
   1. An orifice tube system cannot respond to evaporator temperature. At times of low cooling loads, the orifice tube allows too much refrigerant to flow and floods the evaporator with liquid.
   2. An orifice tube system requires more refrigerant than a TXV system.

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5) Condenser sub-cooling makes sure that there is a liquid seal at the bottom of the condenser so the liquid line or receiver will not have any vapors. Some vehicles use a second condenser to make sure that the refrigerant has condensed into liquid before it exits.
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6) The advantages of a TXV system over an orifice tube system include:
   1. The TXV can maintain a low superheat to ensure that the majority of the evaporator surface is being used, resulting in higher efficiency.
   2. Requires a smaller refrigerant charge.

   The disadvantages of a TXV system over an orifice tube system include:
   1. The system costs more to produce.
   2. There are more moving parts.

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7) The accumulator is used with orifice tube systems and serves three major functions.
   1. Prevents liquid refrigerant from passing to the compressor
   2. Holds the desiccant, which helps remove moisture from the system
   3. Holds a reserve of refrigerant

   The receiver–drier is used with TXV systems and is normally found in the high-side liquid line, somewhere between the condenser and the TXV. It contains filter and a desiccant just as the accumulator.
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