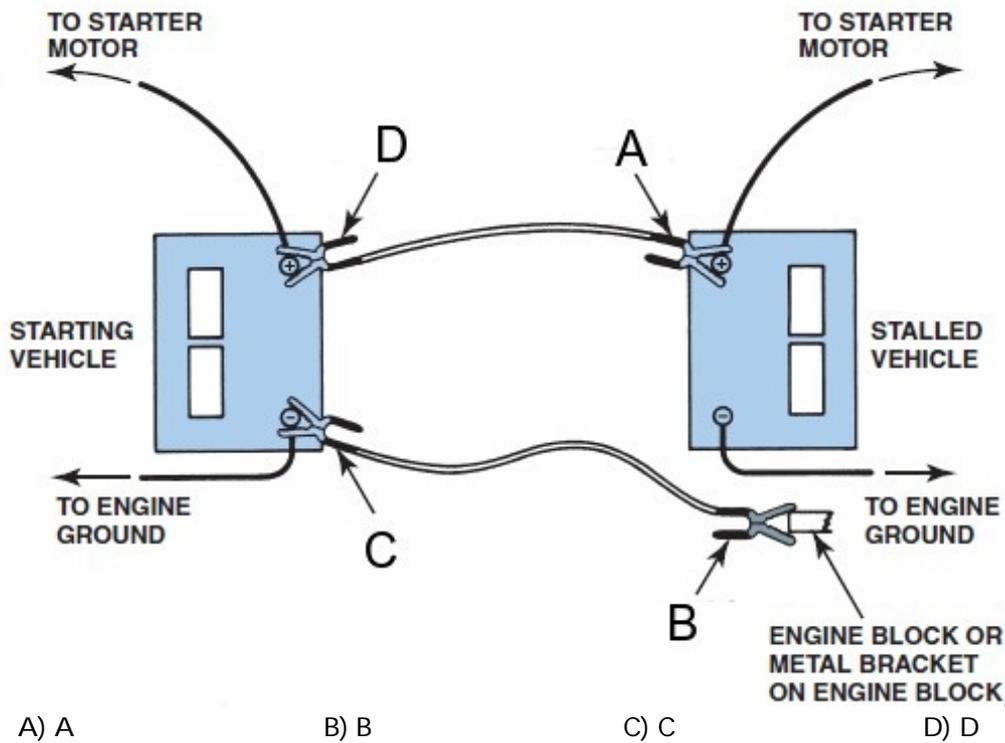


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which size Phillips screwdriver has the largest point? 1) _____
A) 1 B) 3 C) 0 D) 2

2) The proper term for Channel Locks® is _____. 2) _____
A) locking pliers B) Vise Grips®
C) multigroove adjustable pliers D) crescent wrench

3) When jump-starting a vehicle, which of these connections is the last connection to be made? 3) _____



4) For the best working position, the work should be _____. 4) _____
A) at knee or ankle level B) at neck or head level
C) overhead by about one foot D) at chest or elbow level

5) Refer to the picture below. Choose the correct name for the tool.

5) _____



- A) End wrench
- C) Socket wrench

- B) Flare wrench
- D) Combination wrench

6) Technician A says that open end wrenches are the same size on both ends. Technician B says that an open end wrench is the best tool to loosen a seized fastener. Which technician is correct?

6) _____

- A) Technician A only
- C) Both technicians

- B) Technician B only
- D) Neither technician

7) What is the pictured tool(s)?

7) _____



- A) Temperature sensors
- C) Gauge set

- B) Coolant tester
- D) None of these

8) Technician A says that safety glasses are only necessary when working with power tools. Technician B says to remove jewelry when performing automotive service. Which technician is correct?

8) _____

- A) Technician A only
- C) Both technicians

- B) Technician B only
- D) Neither technician

9) A fastener that uses threads on both ends is called a _____.

9) _____

- A) stud
- B) machine screw
- C) crest fastener
- D) cap screw

10) What is this pictured tool set used for?

10) _____

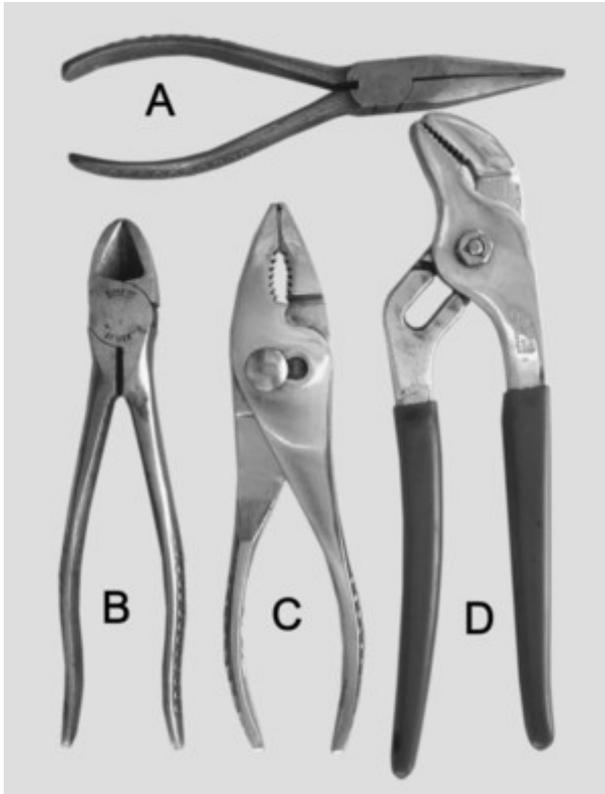


- A) Lug nut removal
- C) Compressor service set

- B) Hose crimper set
- D) None of these

11) Refer to the picture below. Identify tool "B".

11) _____



- A) Slip joint pliers
- C) Diagonal cutter

- B) Needle nose plier
- D) Water pump plier

12) What is NOT considered personal safety equipment?

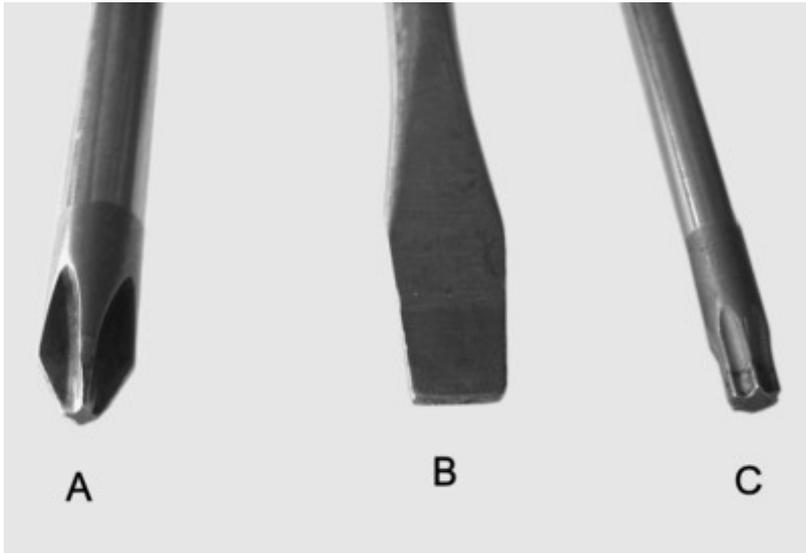
12) _____

- A) Safety glasses
- C) Air impact wrench

- B) Rubber gloves
- D) Hearing Protection

13) Which of these tools is a brand name? 13) _____
A) Monkey wrench B) Locking pliers
C) Vise Grips® D) Side cutters

14) Which of the following is a Torx driver? 14) _____



A) A B) B C) C D) None of these

15) What is the maximum pressure that should be used with compressed air nozzles? 15) _____
A) 120 psi B) 45 psi C) 90 psi D) 30 psi

16) An oil filter should be hot drained for how long before disposing of the filter? 16) _____
A) 4 hours B) 8 hours
C) 12 hours D) 30 to 60 minutes

17) Exposure to asbestos dust can cause what condition? 17) _____
A) Lung cancer B) Asbestosis
C) Mesothelioma D) All of these are possible

18) Which of these is NOT true about used oil? 18) _____
A) It can be used for other purposes.
B) It can be mixed with used antifreeze.
C) It must be stored in an approved container.
D) It can be recycled more than once.

19) Gasoline should be stored in approved containers that include what color(s)? 19) _____
A) A red container B) A yellow container with red lettering
C) A red container with yellow lettering D) A yellow container

20) Technician A says that lead acid batteries may be disposed of in landfills. Technician B says that all automotive battery retailers must post a sign with a recycling symbol visible to customers. Which technician is correct? 20) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician

- 21) Technician A says that brake fluid is hazardous after it has been contaminated with metals from the brake system. Technician B says to dispose of used brake fluid in a special container. Which technician is correct? 21) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 22) Which is NOT considered to be a hazardous solvent? 22) _____
 A) Chlorinated hydrocarbon solvent B) MIBK
 C) Tetrachloroethylene D) Nonchlorinated hydrocarbon solvent
- 23) All of the following are the proper ways to dispose of a drained oil filter EXCEPT _____. 23) _____
 A) disposed of as hazardous waste B) picked up by a service contract company
 C) sent for recycling D) disposed of in regular trash
- 24) What law says employers must provide information about hazardous materials used in the work place? 24) _____
 A) RCRA B) EPA C) OSHA D) Right to know
- 25) Technician A says that major sources of chemical dangers are from solvents containing chlorinated hydrocarbons. Technician B says that the use of heptane or xylene helps to protect the ozone layer. Which technician is correct? 25) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 26) Used engine oil should be disposed of by any of the following methods EXCEPT _____. 26) _____
 A) burned on-site in a waste oil approved heater
 B) disposed of in regular trash
 C) shipped off-site for recycling
 D) burned off-site in a waste oil approved heater
- 27) Technician A says that solvents with a flash point below 140 °F are combustible. Technician B says that solvents with a flash point above 140 °F are flammable. Which technician is correct? 27) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 28) Technician A says that metal gasoline containers should be filled to the top in order to prevent excessive fumes. Technician B says that all gasoline containers should be red in color. Which technician is correct? 28) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 29) Which is NOT an acceptable method of disposing used tires? 29) _____
 A) Shred for use in asphalt B) Landfill
 C) Burn in cement kiln D) Retread
- 30) The Clean Air Act, Title VI Section 609, applies to which automotive system? 30) _____
 A) Power steering B) Brake
 C) Air conditioning D) Exhaust

- 31) The purpose of air conditioning is to _____. 31) _____
 A) remove dust and pollen B) remove heat
 C) remove moisture D) All of the above
- 32) One gallon of gasoline contains about _____ BTUs of thermal energy. 32) _____
 A) 11000 B) 111.5 C) 115000 D) None of these
- 33) A measurement of the actual weight of water in a given volume of air is _____. 33) _____
 A) absolute humidity B) relative humidity
 C) dew point D) absolute pressure
- 34) The amount of water that air can hold depends on _____. 34) _____
 A) the air temperature B) absolute pressure and temperature
 C) barometric pressure and evaporation D) absolute pressure and dew point
- 35) A burning kitchen match gives off about _____ calories? 35) _____
 A) 100 B) 252 C) 1 D) 212
- 36) In addition to cooling the passenger compartment, an air conditioning system _____. 36) _____
 A) dehumidifies the air B) puts moisture in the air
 C) heats the passengers D) All of these
- 37) Technician A says that 1 c of heat can increase the temperature of 1 g of water by 1°F. Technician B 37) _____
 says that the temperature will increase 1°C if 1 c is added. Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 38) Heat intensity refers to which of the following? 38) _____
 A) The heat individuals feel B) The amount of heat in an area
 C) The number of Btu in an area D) None of these
- 39) Heat quantity is measured in _____. 39) _____
 A) BTUs B) degrees C) kilograms D) None of these
- 40) The amount of moisture contained by air is called _____. 40) _____
 A) temperature B) humidity C) ambient D) None of these
- 41) 100 °F is about _____ °C. 41) _____
 A) 38 B) 50 C) 20 D) 45
- 42) Two technicians are discussing heat movement. Technician A says that heat is a form of energy. 42) _____
 Technician B says that heat travels from hot to cold. Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 43) The three states of matter are _____. 43) _____
 A) liquid, vapor, and fluid B) solid, liquid, and fluid
 C) solid, liquid, and vapor D) solid, vapor, and gas

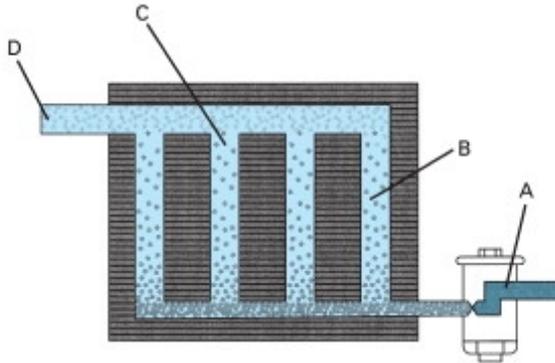
- 44) Many late model vehicles use a(an) _____ to help clean the air in the vehicle. 44) _____
 A) drip system B) cabin filter C) condenser filter D) None of these
- 45) One BTU is equal to _____ calories. 45) _____
 A) 212 B) 32 C) 100 D) 252
- 46) R-12 is normally used with _____ oil 46) _____
 A) PAG B) POE C) mineral D) Any of these
- 47) The change of a liquid into a solid requires the removal of heat. This is called _____. 47) _____
 A) sensible heat B) latent heat of fusion
 C) latent heat of evaporation D) latent heat of condensation
- 48) Which of the following is a form of matter? 48) _____
 A) Gas B) Liquid C) Solid D) All of these
- 49) Compressing a vapor _____ 49) _____
 A) increases the pressure and decreases the temperature.
 B) decreases the pressure and increases the temperature.
 C) increases the pressure and increases the temperature.
 D) decreases the pressure and decreases the temperature.
- 50) _____ causes a change of state in matter. 50) _____
 A) Sensible heat B) Latent heat
 C) Both A and B D) Neither A nor B
- 51) Which of the following is true about heat? 51) _____
 A) Cold is the lack of heat.
 B) Heat is a form of energy.
 C) Heat always travels from something warm to something cold.
 D) All of these are true.
- 52) Zero psig is _____. 52) _____
 A) the lowest point on a vacuum gauge
 B) the zero point on all gauges
 C) equal to about 15 psi on the absolute pressure scale
 D) All of these
- 53) The change of a vapor into a liquid requires the addition of heat. This is called _____. 53) _____
 A) latent heat of fusion B) sensible heat
 C) latent heat of evaporation D) latent heat of condensation
- 54) The boiling point of a liquid can be increased by raising the _____. 54) _____
 A) pressure B) temperature C) latent heat D) All of these
- 55) Two technicians are discussing heat. Technician A says that heat always travels from hot to cold. 55) _____
 Technician B says that heat is a form of energy. Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

- 56) Superheat refers to temperature increases in a vapor after all of the liquid has boiled. 56) _____
 A) True B) False
- 57) An atom consists of all of the following EXCEPT _____. 57) _____
 A) electrons B) molecules C) protons D) None of these
- 58) It takes _____ BTUs of heat to cause a change of state from 1 lb of water to 1 lb of steam. 58) _____
 A) 212 B) 32 C) 970 D) 100
- 59) Technician A says that the freezing point of a substance is the temperature at which the substance changes state from a solid to a liquid. Technician B says that the freezing point of a substance is the temperature at which the substance changes state from a liquid to a solid. Which technician is correct? 59) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 60) In an air conditioning system the refrigerant _____. 60) _____
 A) changes from a liquid to a gas B) changes from a liquid to a solid
 C) is always a gas D) is always a liquid
- 61) The global warming potential (GWP) of a refrigerant is a measure of the refrigerant's ability to _____. 61) _____
 A) trap heat B) hold a high pressure
 C) ignite D) produce low temperatures
- 62) Which of these new refrigerants does General Motors intend to use in future vehicles? 62) _____
 A) R-152a B) R-134a C) R-1234yf D) CO₂
- 63) Technician A says that R-12 refrigerant released into the atmosphere damages the ozone layer. Technician B says that holes in the ozone layer allow ultraviolet light to reach the Earth. Which technician is correct? 63) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 64) Too much ultraviolet light reaching the Earth's surface results in _____. 64) _____
 A) destruction of oceanic plankton B) increased instances of skin cancer
 C) increased instances of cataracts D) All of the above
- 65) Technician A says that the recovery tank used in a recovery system must be checked and certified every 3 years. Technician B says that a disposable refrigerant tank should be properly evacuated before disposal. Which technician is correct? 65) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 66) Technician A says that butane and propane will work as refrigerants. Technician B says that these gases present a fire hazard during service procedures. Which technician is correct? 66) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

- 67) Two technicians are discussing the retrofit procedure. Technician A says that the service ports must be changed to match the new refrigerant. Technician B says that a new label must be installed over the old one to identify the new refrigerant and oil. Which technician is correct? 67) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 68) The ozone layer primarily filters what type of radiation? 68) _____
 A) Infrared B) Ultraviolet
 C) Thermal D) None of these is correct
- 69) Two technicians are discussing the practice of topping off an R-12 system. Technician A says that this practice is no longer profitable. Technician B says that it is not recommended because of ozone depletion. Which technician is correct? 69) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 70) The most common automotive refrigerant prior to the 1990s was _____. 70) _____
 A) R-11 B) R-12 C) R-134a D) R-121
- 71) Technician A says that mixing small amounts of refrigerant is acceptable according to the EPA. Technician B says that each refrigerant must have unique fittings to reduce accidental mixing of refrigerants. Which technician is correct? 71) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 72) One drawback to using CO₂ (R-744) as a refrigerant is _____. 72) _____
 A) CO₂ is flammable B) CO₂ is hard to produce
 C) CO₂ is damaging to plant life D) CO₂ system pressures are extremely high
- 73) One possible new type of vehicle air conditioning system is the _____ system. 73) _____
 A) closed loop B) bi-cooling
 C) secondary loop D) raw water cooled
- 74) Mixing two different refrigerants _____. 74) _____
 A) makes a contaminated mixture that is expensive to dispose of
 B) creates a zeotrope
 C) is illegal
 D) All of these
- 75) Two technicians are discussing Section 609 of the Clean Air Act. Technician A says that it requires that A/C technicians be properly trained and certified. Technician B says Section 609 requires that recovery and recycling equipment be of an approved type. Which technician is correct? 75) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 76) Most cars use _____ to warm the passenger compartment. 76) _____
 A) burning fuel B) electrical induction
 C) hot coolant D) Any of these

- 77) Which of the following describes a drawback of mechanical refrigeration? 77) _____
- A) R-12 must be added continuously.
 - B) It takes energy to drive the compressor.
 - C) Oil must be added continuously.
 - D) The passenger compartment does not get cool enough.

- 78) In this diagram of an evaporator, what is happening to the refrigerant at point "B"? 78) _____



- A) It is condensing
- B) It is freezing
- C) It is boiling
- D) It is changing from red to blue

- 79) Heated seats may use any of the following, EXCEPT _____. 79) _____
- A) a TE device
 - B) a resistive heating element
 - C) a timer
 - D) circulated hot water

- 80) In the automobile, a heat load comes from _____. 80) _____
- A) the sun load on the car
 - B) a cold winter day
 - C) the engine cooling system
 - D) None of these

- 81) As the refrigerant passes through the condenser, it _____. 81) _____
- A) gives up latent heat to the air flow
 - B) condenses from a gas to a liquid
 - C) is cooled by ambient air
 - D) All of these

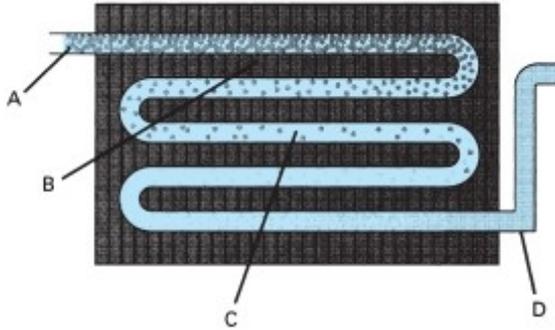
- 82) Technician A says that some devices generate heat by compressing a gas to a higher pressure. Technician B says that some devices generate cool air by allowing a compressed gas to expand. Which technician is correct? 82) _____
- A) Technician A only
 - B) Technician B only
 - C) Both technicians
 - D) Neither technician

- 83) What two things are accomplished in the condenser? 83) _____
- A) remove latent heat
 - B) recycle the gas back to a liquid
 - C) Both A and B
 - D) Neither A nor B

- 84) Two technicians are discussing HVAC systems. Technician A says that the evaporator moves heat from the passenger compartment to the refrigerant. Technician B says that the refrigerant boils inside the evaporator. Which technician is correct? 84) _____
- A) Technician A only
 - B) Technician B only
 - C) Both technicians
 - D) Neither technician

85) In a hybrid vehicle, heat may be added to the heater by _____. 85) _____
 A) a PTC ceramic element B) an extra heater core
 C) increasing engine running time D) None of these

86) In this diagram of a condenser the refrigerant enters at point "A" and leaves at point "D". What is the state of the refrigerant at point "C"? 86) _____



A) liquid B) changing from liquid to gas
 C) changing from gas to liquid D) gas

87) In a CO₂ (R-744) system the high side pressure is above the critical pressure. This means that _____. 87) _____
 A) the CO₂ may solidify
 B) the CO₂ will not condense to a liquid form
 C) the CO₂ may be vented due to excessive pressure
 D) None of these

88) In an evaporative cooling system, evaporating 1 pound of water absorbs _____ Btu. 88) _____
 A) 40 B) 212 C) 540 D) 970

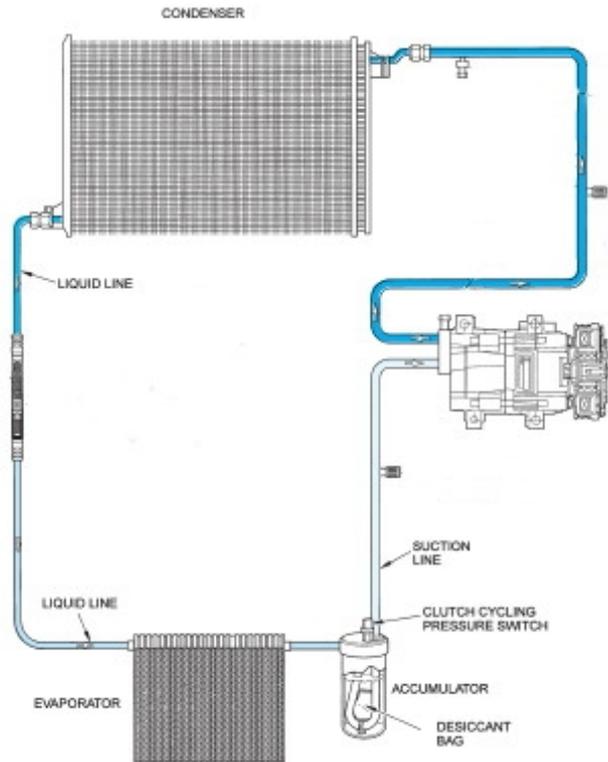
89) When an A/C system is operating, the compressor _____ runs hot. 89) _____
 A) inlet B) outlet C) Both A and B D) Neither A nor B

90) Compressing a vapor _____. 90) _____
 A) increases the pressure and decreases the temperature
 B) increases the pressure and increases the temperature
 C) decreases the pressure and increases the temperature
 D) decreases the pressure and decreases the temperature

91) Two technicians are discussing the lines used to connect the A/C components. Technician A says they are usually rubber hoses with metal ends. Technician B says that metal tubing is often used. Which technician is correct? 91) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

92) What type of refrigeration system is shown in this illustration?

92) _____



- A) orifice tube system
- B) electric compressor system
- C) full flow system
- D) TXV system

93) The TXV is located at the _____.

93) _____

- A) condenser outlet
- B) condenser inlet
- C) evaporator outlet
- D) evaporator inlet

94) Which system utilizes a receiver-drier?

94) _____

- A) Variable Displacement Orifice Tube System
- B) Variable Displacement Thermostatic Expansion Valve System
- C) Cycling Clutch Orifice Tube System
- D) None of the above

95) Modern automotive refrigerant systems can be all of the following EXCEPT _____.

95) _____

- A) Thermostatic expansion valve
- B) Orifice tube
- C) Variable displacement
- D) Modern automotive refrigerant systems may be any of these

96) Some hybrid vehicles use a(an) _____ compressor to keep the AC system operating in cases where the engine is off.

96) _____

- A) hydraulic
- B) belt driven/electric hybrid
- C) electrically driven scroll
- D) Either B or C

- 97) Refrigerant entering the condenser should be _____. 97) _____
 A) low pressure liquid B) low pressure vapor
 C) high pressure vapor D) high pressure liquid
- 98) An accumulator is very similar to a(n) _____. 98) _____
 A) receiver-drier B) condenser C) orifice tube D) evaporator
- 99) An automotive A/C compressor is of the _____ type. 99) _____
 A) scroll B) rotary vane
 C) reciprocating piston D) Any of these
- 100) Which of the following best describes the low side of a system? 100) _____
 A) High pressure and high temperature B) Low pressure and low temperature
 C) Low pressure and high temperature D) High pressure and low temperature
- 101) The refrigerant inside an evaporator is a _____. 101) _____
 A) gas changing to a liquid B) liquid
 C) liquid changing to a gas D) gas
- 102) The receiver/drier or accumulator is placed in the system _____. 102) _____
 A) as a separation between the high side and the low side
 B) as a storage tank for the refrigerant
 C) to prevent the system from being overcharged
 D) to meter the refrigerant to the evaporator
- 103) Desiccant is placed in the receiver-drier or accumulator-drier _____. 103) _____
 A) to trap excess oil in the system
 B) to absorb moisture from the system
 C) to slow down refrigerant flow
 D) as this is the only place that it can be located
- 104) A "starved" evaporator is one that has low pressure but a too warm temperature. This is due to _____. 104) _____
 A) too low of a refrigerant charge B) restricted air flow over the evaporator
 C) too high of a refrigerant charge D) None of these
- 105) The refrigerant enters the evaporator as _____. 105) _____
 A) a high-pressure gas B) a low-pressure vapor
 C) a high-pressure liquid D) a low-pressure atomized liquid

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 106) Some systems have a modulator instead of a receiver-drier. 106) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 107) A compressor clutch that cycles on and off rapidly is an indication of _____. 107) _____
 A) a loose compressor clutch magnet B) a low refrigerant charge
 C) a frozen evaporator D) a low idle speed

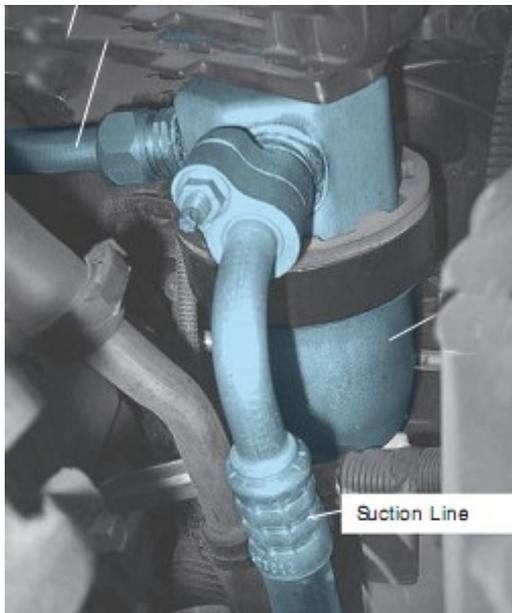
108) Two technicians are discussing A/C systems. Technician A says that TXV systems use a receiver-drier mounted in the suction line. Technician B says that OT systems use an accumulator in the suction line. Which technician is correct? 108) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

109) The General Motors variable displacement compressor has _____ cylinders. 109) _____
 A) 8 B) 4 or 5 C) 6 D) 5 or 7

110) The variable displacement compressor uses _____. 110) _____
 A) a swash plate B) a variable angle wobble plate
 C) an impellor D) four pistons

111) Most York compressors use cylinders made from _____. 111) _____
 A) cast iron B) aluminum C) Both A and B D) Neither A nor B

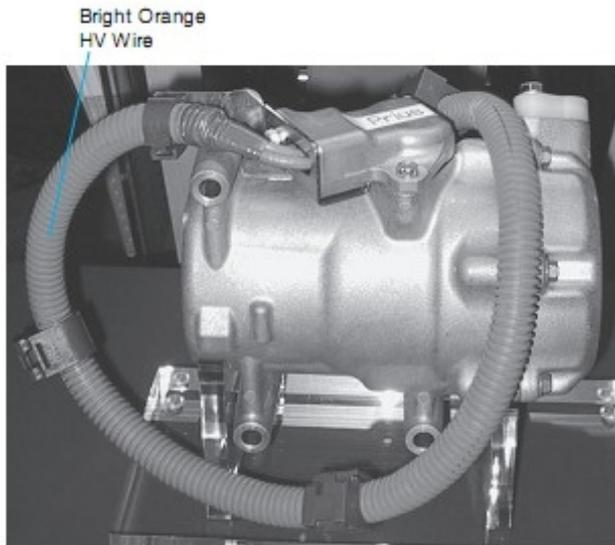
112) Identify the component illustrated below. 112) _____



- A) A muffler B) A suction side filter
 C) Accumulator D) Receiver-drier

113) Identify the component shown.

113) _____



- A) A high voltage compressor package
- B) A 12 volt compressor package
- C) An electric water pump
- D) A generator

114) Which type of refrigerant hose is used with an R-134a system?

114) _____

- A) Rigid hose
- B) Barrier hose
- C) A solid nylon type hose
- D) Flexible, porous hose

115) The reciprocating piston compressor used on many older General Motors vehicles is designated by which of the following?

115) _____

- A) DA-6
- B) A-6
- C) R-6
- D) D-6

116) Two technicians are discussing line fittings. Technician A says that many early A/C systems used flare fittings. Technician B says that modern systems commonly use O-rings to seal the fittings, and these are much easier to repair than flare fittings. Which technician is correct?

116) _____

- A) Technician A only
- B) Technician B only
- C) Both technicians
- D) Neither technician

117) The pressure cycling switch does which of the following?

117) _____

- A) Senses low-side pressure
- B) Senses condenser temperature
- C) Closes the TXV
- D) Senses high-side pressure

118) What is the function of the desiccant bag inside an accumulator?

118) _____

- A) It captures and stores moisture.
- B) It captures excess R 134a.
- C) It stores and releases ice.
- D) All of the above.

119) A damper drive compressor turns the compressor input shaft _____.

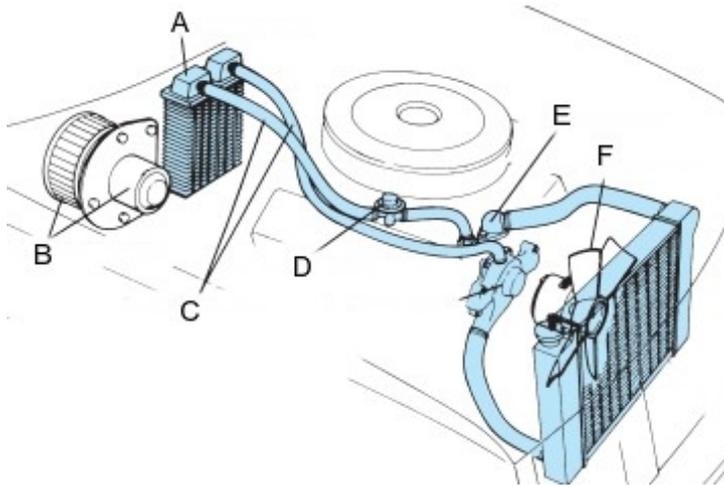
119) _____

- A) whenever the clutch magnet is energized
- B) only during high moisture conditions
- C) when the engine is in auto-stop
- D) whenever the engine is running

- 120) Two technicians are discussing refrigerant oils. Technician A says that the mineral oil used in R-12 systems is completely compatible with R-134a. Technician B says a synthetic oil should be used with R-134a. Which technician is correct? 120) _____
- A) Technician A only
B) Technician B only
C) Both technicians
D) Neither technician
- 121) A hybrid vehicle may use which of the following to warm the vehicle occupants? 121) _____
- A) An auxillary water pump
B) PTC heater elements
C) A heat pump
D) Any of these
- 122) Coolant flow to the heater core may be controlled by a _____. 122) _____
- A) cable mechanism
B) heater water control valve
C) vacuum mechanism
D) Any of these
- 123) The control for most heater control valves is by a _____. 123) _____
- A) Bowden cable
B) vacuum motor
C) Either A or B
D) Neither A nor B
- 124) A vehicle's heater is stuck in defrost only mode. This could indicate a failure of _____. 124) _____
- A) the AC compressor
B) the thermostat
C) the heater system controls
D) None of these
- 125) Two technicians are discussing heater temperature control. Technician A says that a control valve will be wide open when full heat is desired. Technician B says the coolant control valve should go wide open if the vacuum line is disconnected. Which technician is correct? 125) _____
- A) Technician A only
B) Technician B only
C) Both technicians
D) Neither technician
- 126) Two technicians are discussing heater hoses. Technician A says that most hoses have an inside diameter of about one inch or larger. Technician B says the heater core inlet hose is usually larger than the outlet. Which technician is correct? 126) _____
- A) Technician A only
B) Technician B only
C) Both technicians
D) Neither technician
- 127) Some cars use metal tubing for coolant flow to the core to allow routing _____. 127) _____
- A) through very congested areas with tight bends
B) past very hot places
C) Either of these
D) Neither of these

128) Identify the heater core in this illustration.

128) _____



A) A

B) B

C) F

D) D

129) Two technicians are discussing the heater output temperature. Technician A says that a valve is used to reduce coolant flow through the core when less heat is desired. Technician B says that most modern systems use a blend-air door to control the coolant flow. Which technician is correct?

129) _____

A) Technician A only

B) Technician B only

C) Both technicians

D) Neither technician

130) Two technicians are discussing the heater core. Technician A says that a heater core is a heat exchanger much like a radiator. Technician B says the coolant from the engine brings the heat to the heater core. Which technician is correct?

130) _____

A) Technician A only

B) Technician B only

C) Both technicians

D) Neither technician

131) Some vehicles can operate the heater even when the engine is turned off. This done by using _____.

131) _____

A) seat blanketing

B) an electric boost heater

C) an auxiliary water pump

D) None of these

132) An aftermarket heater system consists of _____.

132) _____

A) a core

B) control switches

C) a blower

D) All of the above

133) With most cars, heater outlet temperature is adjusted by controlling the flow of _____ through the heater core.

133) _____

A) air

B) coolant

C) Either of these

D) Neither of these

134) Heater hoses are attached to the core using _____.

134) _____

A) clamps

B) quick-connect couplings

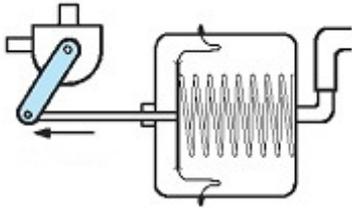
C) Both A and B

D) Neither A nor B

135) Two technicians are discussing the coolant flow through a heater core. Technician A says that heated coolant enters the heater inlet hose close to the engine thermostat. Technician B says the coolant from the heater core returns to the water pump outlet. Which technician is correct? 135) _____

A) Technician A only
 B) Technician B only
 C) Both technicians
 D) Neither technician

136) Identify this component. 136) _____



- A) A vacuum motor
 B) A heating coil
 C) A vacuum pump
 D) None of these

137) Two technicians are discussing A/C blower operation. Technician A says that modern systems use a squirrel-cage type blower. Technician B says that a plain fan-type unit is used with systems having cable type controls. Which technician is correct? 137) _____

A) Technician A only
 B) Technician B only
 C) Both technicians
 D) Neither technician

138) Two technicians are discussing A/C door operation. Technician A says that when the control head is set to heat, the mode door should direct air discharge from the instrument panel ducts. Technician B says the air discharge should be at floor level. Which technician is correct? 138) _____

A) Technician A only
 B) Technician B only
 C) Both technicians
 D) Neither technician

139) Ram air is the result of _____. 139) _____

A) the force of air caused by the blower fan
 B) the air intake system
 C) the forward motion of the vehicle
 D) the manifold vacuum

140) When an A/C system is set to "recirculate" the inlet air for the evaporator comes from _____. 140) _____

A) inside the vehicle
 B) outside the vehicle
 C) Both of these
 D) Neither of these

141) An ATC system uses a(n) _____ sensor to determine the temperature of the incoming air. 141) _____

A) anticipation
 B) ambient
 C) in-vehicle
 D) sunload

142) Most vacuum control valves have _____ operating position(s). 142) _____

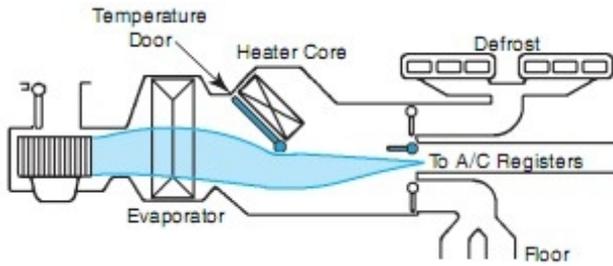
A) four
 B) two
 C) three
 D) one

143) On vehicles equipped with a series of resistors in the blower motor circuit, the HIGH fan setting _____ 143) _____

A) causes electrical current to flow through all resistors in the circuit
 B) bypasses the resistors in the circuit
 C) directs electrical current through only one resistor in the circuit
 D) None of these is correct

144) The _____ blower speed has the least electrical resistance. 144) _____
 A) medium-high B) low C) high D) medium-low

145) Refer to the diagram below. As drawn, the system is in _____ mode. 145) _____



A) full hot B) full cold C) air mix D) None of these

146) A vacuum check valve is used to _____. 146) _____

- A) maintain vacuum in the vacuum reservoir under high load/speed conditions
- B) trap manifold vacuum in the intake manifold
- C) prevent vacuum from becoming too high in the vacuum reservoir
- D) increase the vacuum in the vacuum reservoir

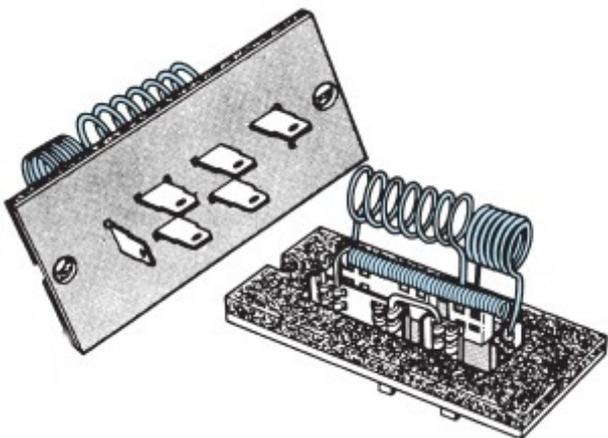
147) Technician A says that all modern vehicles control the temperature of circulated air with an electronic control head. Technician B says that some vehicles use a manual slider and cables to control the temperature of circulated air. Which technician is correct? 147) _____

- A) Technician A only
- B) Technician B only
- C) Both technicians
- D) Neither technician

148) Which of the following is true regarding the cabin air filter? 148) _____

- A) It is mounted in the incoming air stream from the cowl intake
- B) Filter restrictions can reduce the volume of air entering the passenger compartment
- C) Both A and B are correct
- D) Neither A nor B is correct

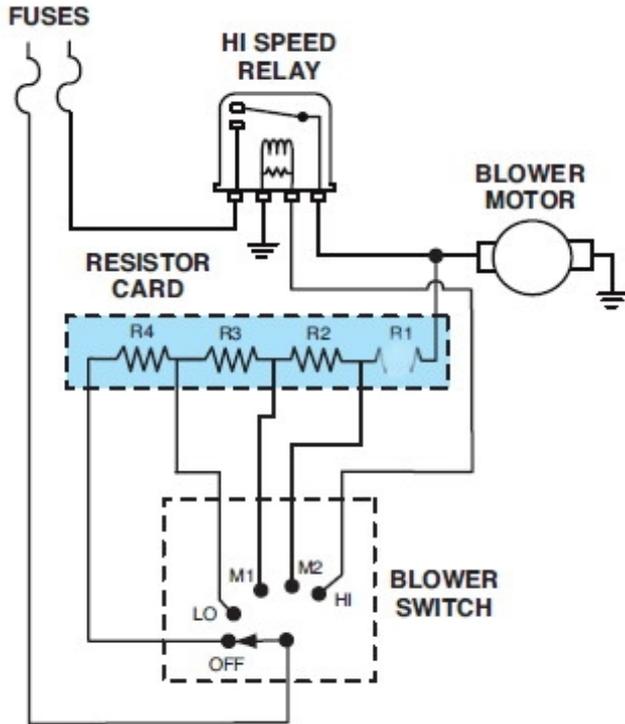
149) Identify this component. 149) _____



- A) Blower resistor pack
- B) Door return spring assembly
- C) Heating element
- D) None of these

150) What would be the result of a burned open R1 resistor in this diagram?

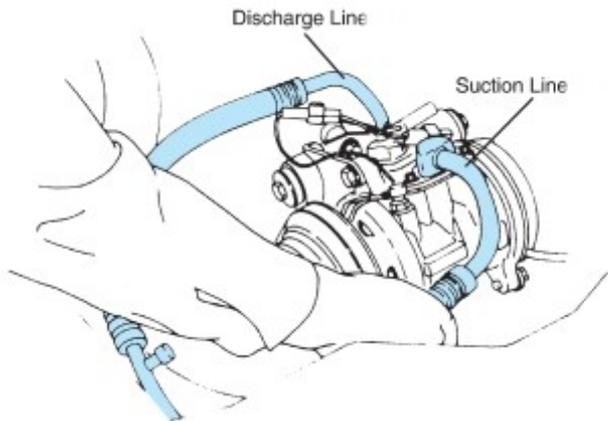
150) _____



- A) Blower does not operate at all
- B) Blower only operates in HI position only
- C) No blower operation in LO position only
- D) No blower operation in M2 position only

151) This technician is checking A/C operation. With the compressor running, the suction line should be _____.

151) _____



- A) cold
- B) frozen
- C) hot
- D) warm

152) Access to hidden areas behind the dash can often be improved by removing the _____.

152) _____

- A) passenger seat
- B) glove compartment
- C) windshield
- D) None of these

- 153) Technician A says that foul-smelling air from the A/C ducts is caused by bacteria growing on the evaporator fins. Technician B says that this problem can be cured by installing a control that operates the blower motor after the vehicle is shut off. Which technician is correct? 153) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 154) Technician A says that a quick check of A/C system operation is to feel the temperature of the suction and discharge lines. Technician B says that the suction line should be cold and the discharge line hot after a minute of system operation. Which technician is correct? 154) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 155) Technician A says that sometimes nothing is wrong with a system when there is a complaint of insufficient cooling. Technician B says that you should begin diagnosing this complaint by checking the A/C system pressures. Which technician is correct? 155) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 156) Technician A says that you should begin HVAC problem diagnosis with a thorough inspection. Technician B says that you can determine from the inspection what type of system you are dealing with. Which technician is correct? 156) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 157) Technician A says that oily residue on a hose can indicate a refrigerant leak. Technician B says that this residue is normal for most connections. Which technician is correct? 157) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 158) A high pitched noise from the compressor during engagement could be caused by _____. 158) _____
 A) excessive high side pressure B) a missing belt
 C) a disconnected clutch electrical connector D) an oily clutch surface
- 159) Technician A says that a misadjusted blend door can cause poor A/C operation. Technician B says that you can check this by clamping off a heater hose. Which technician is correct? 159) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 160) Vibrating A/C hoses that make groundout noise can be repaired by _____. 160) _____
 A) separating them from the other surface B) clamping them together
 C) Either A or B D) Neither A nor B
- 161) Technician A says that a refrigerant line groundout problem makes a whining noise at moderate speeds. Technician B says that knocking noises are a sure sign that the compressor has failed. Which technician is correct? 161) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

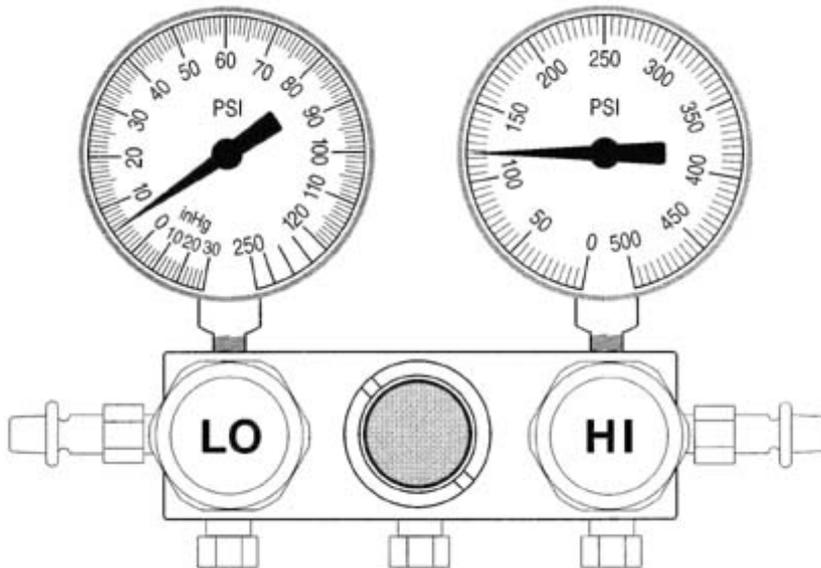
162) Technician A says that while the compressor clutch is off, it's OK if the pulley and clutch plate touch. Technician B says that too much air gap can cause clutch slippage during engagement. Which technician is correct? 162) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

163) Which of the following is a frequent cause of air conditioning system noise and vibration? 163) _____
 A) Defective reed valves B) Incorrectly routed lines and hoses
 C) Misadjusted pressure-cycling switch D) Improper clutch air gap

164) Technician A says that a stinky evaporator can be cured by spraying a fungicide into the fresh air register in front of the windshield. Technician B says this problem is more common in areas of high humidity. Which technician is correct? 164) _____
 A) Technician A only B) Technician B only
 C) Both technician D) Neither technician

165) A missing A/C service cap can allow a leak of up to _____ of refrigerant per year. 165) _____
 A) 1 pound
 B) the valve seals the port, so there will be no leakage
 C) 1 gallon
 D) 1 ounce

166) The discharge air temperature is warm and the pressure gauges shown represent which *most likely* cause? 166) _____



- A) Low on refrigerant B) Lack of airflow through the condenser
 C) Icing of the evaporator D) Defective compressor

167) In most R-12 systems that use an STV, the normal low-side pressure should be about _____. 167) _____
 A) 15 to 20 psi B) 28 to 30 psi C) 15 to 30 psi D) over 35 psi

- 168) A customer states that the vehicle does not cool as well as it should. Technician A says that the system could be low on charge. Technician B says that a non-functional radiator cooling fan can cause a lack of cooling inside the vehicle. Which technician is correct? 168) _____
 A) Technician A only B) Technician B only
 C) Both technician D) Neither technician
- 169) _____ can be used to locate refrigerant leaks. 169) _____
 A) Electronic testers B) Flame-type testers
 C) Soap and water D) Any of these
- 170) While discussing a manifold gauge set, technician A says that the high-side service hose is blue. Technician B says that the low-side pressure gauge goes up to 750 psi. Which technician is correct? 170) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 171) An R-12 system is shut off, and the ambient temperature is 70°F. The evaporator pressure should be about _____. 171) _____
 A) 83 psi B) 70 psi C) 50 psi D) 100 psi
- 172) Regulations require any shop performing A/C work to have _____. 172) _____
 A) certified personnel B) refrigerant recycling equipment
 C) Both A and B D) Neither A nor B
- 173) High-side pressure is affected by _____. 173) _____
 A) ambient temperature B) refrigerant charge level
 C) fan clutch operation D) All of these
- 174) A faulty A/C system has a high low-side pressure and a high high-side pressure. Technician A says that the system is probably starved. Technician B says that the system has a bad thermostatic switch. Which technician is correct? 174) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 175) Technician A says that pressure checks are one method of diagnosing A/C problems. Technician B says that trouble trees are used only for mechanical problems. Which technician is correct? 175) _____
 A) Technician A only B) Technician B only
 C) Both technician D) Neither technician
- 176) In a system that is operating correctly, the lines and hoses on the high side should be _____. 176) _____
 A) cool to the touch B) hot to the touch
 C) Either A or B D) Neither A nor B
- 177) Technician A says that oily residue on a fitting or hose can indicate a refrigerant leak. Technician B says that this residue will not affect a leak detector. Which technician is correct? 177) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

- 178) An automotive air conditioning system is being tested for a lack-of-cooling complaint. Both high and low pressures are higher than normal. Technician A says that the system is low on charge. Technician B says that the system is overcharged. Which technician is correct? 178) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 179) Two technicians are discussing leak testing of an air-conditioning system. Technician A says to check the evaporator for leaks at the condensate drain tube Technician B says that water will not damage the electronic leak tester probe. Which technician is correct? 179) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 180) Technician A says that the manifold gauge set for R-12 can be used on all systems. Technician B says that R-134a systems use service ports with metric flare threads. Which technician is correct? 180) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 181) Under what conditions should vacuum readings be taken to test supply vacuum for the actuators? 181) _____
 A) At wide open throttle B) With the engine off
 C) With the pressure relief grilles blocked D) Engine running
- 182) A vacuum check valve is used to _____ 182) _____
 A) increase the vacuum in the vacuum reservoir.
 B) maintain vacuum in the vacuum reservoir under high load/speed conditions.
 C) prevent vacuum from becoming too high in the vacuum reservoir.
 D) trap manifold vacuum in the intake manifold.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

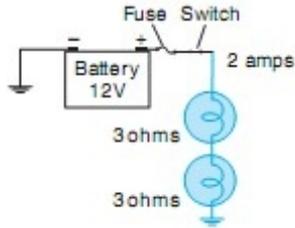
- 183) A plugged cabin air filter can cause engine overheating. 183) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 184) A lack of heat from the heater is being diagnosed. Which is the MOST LIKELY cause? 184) _____
 A) A partially clogged heater core B) A partially clogged radiator
 C) Hoses reversed on the heater core D) A defective water pump
- 185) Technician A says that the heater core inlet hose is connected to the water pump inlet. Technician B says that the heater inlet hose is often bigger than the outlet hose. Which technician is correct? 185) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 186) Typical intake manifold vacuum readings at idle are _____. 186) _____
 A) 10 to 12 in-Hg B) 18 to 20 in-Hg
 C) at least 40 in-Hg D) more than 30 in-Hg
- 187) Technician A says a plugged heater core can be cleaned by filling it with ammonia. Technician B says the best repair is to replace the heater core. Which technician is correct? 187) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

198) A vehicle with an ATC system has heater and defroster operation, but the A/C is not working properly. To diagnose this problem, the technician should _____. 198) _____
 A) check for trouble codes B) clear the trouble codes
 C) Both A and B D) Neither A nor B

199) What type of circuit is shown? 199) _____



A) series circuit B) open circuit C) twin circuit D) parallel circuit

200) Which of the following test instruments can be used on any automotive electrical circuit? 200) _____
 A) Test light B) Analog multimeter
 C) Ohmmeter D) DMM

201) The blower motor runs on high speed only. This indicates a faulty _____. 201) _____
 A) switch B) high blower relay
 C) resistor bank D) None of these

202) If a conductor has infinite resistance it is _____. 202) _____
 A) closed B) corroded C) grounded D) open

203) A blower motor stopped working on all speeds. A technician tested the motor touching a jumper wire from the battery positive (+) terminal to the motor power terminal and the motor did run. Technician A says that the motor should be checked using a fused jumper lead to test for excessive current draw. Technician B says that the resistor pack and/or relay are likely to be defective. Which technician is correct? 203) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

204) An example of a short circuit is a _____. 204) _____
 A) burned wire with bad insulation that touches ground
 B) clutch coil with a resistance of 0.5 Ω
 C) burned-out light bulb
 D) Any of these

205) Technician A says most late-model control systems allow the system to communicate with diagnostic test equipment. Technician B says most late-model control systems can run pre-programmed system diagnostics and generate trouble codes. Which technician is correct? 205) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

206) A rule of thumb for clutch coil resistance is _____. 206) _____
 A) 10 ohms B) 5 to 10 ohms C) about 5 amps D) 3 to 5 ohms

207) Which of the following is monitored by a sensor in an ATC system? 207) _____
A) Ambient temperature B) Sunload
C) In-vehicle temperature D) All of these

208) Which of the following is true concerning ohmmeters? 208) _____
A) Ohmmeters can be used on live circuits.
B) Ohmmeters are self-powered.
C) Ohmmeters cannot be used to check continuity.
D) None of these are true.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

209) Most automotive electrical systems use AC current. 209) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

210) The resistance to electrical flow through a component is measured in _____. 210) _____
A) amperes B) watts C) ohms D) volts

211) What is the purpose of evacuating the A/C system? 211) _____
A) To remove any foreign substances inside the system
B) To eliminate any moisture inside the system
C) Both A and B are correct
D) Neither A nor B is correct

212) The new SAE standard J2788 requires improved performance from _____. 212) _____
A) the R134a refrigerant B) the vehicle heating system
C) the seat heaters D) recovery and recycling machines

213) Technician A says that the same recovery unit can be used for R-12 and R-134a. Technician B says that the service hoses from an R-134a recovery unit must have shutoff valves within 18 inches of the end. Which technician is correct? 213) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician

214) Technician A says that high pressure in recycled refrigerant is only caused by air contamination. Technician B says that recycled refrigerant should meet the same purity standards as new refrigerant. Which technician is correct? 214) _____
A) Technician A only B) Technician B only
C) Both technician D) Neither technician

215) Technician A says that retrofitting a system is simply a matter of recovering the R-12 and recharging it with a drop-in refrigerant. Technician B says that the charge level specification is the same with R-134a as with R-12. Which technician is correct? 215) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician

216) Technician A says that vacuum is usually measured in psi. Technician B says vacuum is usually measured in inches of mercury (Hg). Which technician is correct? 216) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician

- 217) A refrigerant container has been found to have a pressure above the maximum for its temperature. What should you do? 217) _____
 A) Use a vacuum pump to correct the container pressure.
 B) Vent R134a vapor from the container into the atmosphere.
 C) Recycle the refrigerant in the container.
 D) Store the container in a cooler place.
- 218) Too much oil in the system will cause _____. 218) _____
 A) excessive pressures
 B) compressor clutch slippage
 C) excessive noise
 D) None of these
- 219) A vacuum pump removes water from the air conditioning system by _____. 219) _____
 A) condensing it
 B) boiling it
 C) mixing it with the oil
 D) pulling it into the desiccant
- 220) Two technicians are discussing how to remove refrigerant from a system. Technician A says that you can vent it into the atmosphere as long as it has moisture in it. Technician B says that all refrigerant must be captured. Which technician is correct? 220) _____
 A) Technician A only
 B) Technician B only
 C) Both technician
 D) Neither technician
- 221) Technician A says that SNAP approval indicates a good refrigerant that will have no problems in a system. Technician B says that using any refrigerant that contains R-22 requires the system to have barrier hoses. Which technician is correct? 221) _____
 A) Technician A only
 B) Technician B only
 C) Both technicians
 D) Neither technician
- 222) Refrigerant can be contaminated with NCG if the _____. 222) _____
 A) system is not thoroughly evacuated before recharging
 B) technician uses sloppy service procedures
 C) recovery unit hose is not tight
 D) All of these
- 223) Technician A says evacuation is done with both manifold valves open. Technician B says a reading of 10 in-Hg after 5 minutes of evacuation is normal. Which technician is correct? 223) _____
 A) Technician A only
 B) Technician B only
 C) Both technicians
 D) Neither technician
- 224) Technician A says that eye protection should be worn when working with refrigerants. Technician B says to avoid skin contact with refrigerants and their oil. Which technician is correct? 224) _____
 A) Technician A only
 B) Technician B only
 C) Both technician
 D) Neither technician
- 225) A container of recovered R134a refrigerant has a pressure of 91 psi at 80 °F. This indicates _____. 225) _____
 A) that the container is overheated
 B) that air is in the container
 C) that the refrigerant is contaminated
 D) a normal condition

- 226) Technician A says that new refrigerant oil should be added to new components such as accumulators or condensers as they are installed. Technician B says that two wrenches should be used when tightening most line fittings. Which technician is correct? 226) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 227) Technician A says the clutch usually must be removed when replacing a compressor pulley or bearing. Technician B says special service tools are usually needed to replace a compressor clutch assembly. Which technician is correct? 227) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 228) Technician A says that the oil level in an A/C compressor can be checked at any time. Technician B says that the system must be empty before checking the oil level. Which technician is correct? 228) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 229) Technician A says that you must install the compressor and charge the system to check for seal leaks. Technician B says that if you apply pressure to a compressor discharge port, pressure will show up immediately at the suction port. Which technician is correct? 229) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 230) Screw-type clamps can be used with R 134a systems as long as they are torqued. 230) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 231) When a compressor is replaced, it is a good practice to also replace the _____. 231) _____
 A) TXV B) OT
 C) receiver-drier or accumulator D) Both A and B
- 232) O-rings should be lubricated with _____. 232) _____
 A) mineral oil B) motor oil C) PAG oil D) penetrating oil
- 233) Technician A says that all O-rings are OK to use with R 134a systems. Technician B says that the color of the O-ring indicates the material it is made from. Which technician is correct? 233) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

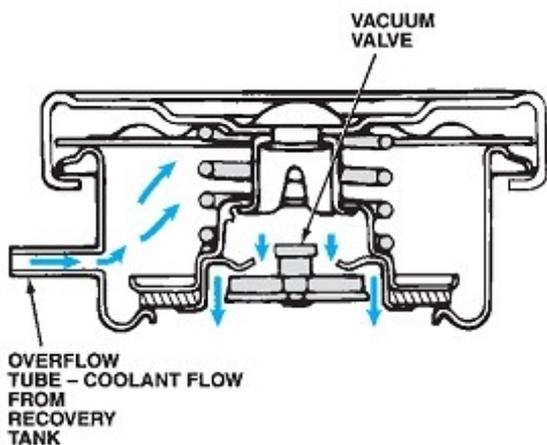
TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 234) Most AC components can be replaced without recovering the refrigerant first. 234) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 235) Which of the following can cause compressor damage due to lack of lubrication? 235) _____
 A) Mixing different oils B) Low oil charge
 C) Low refrigerant charge D) All of the above

- 236) Normal compressor repairs include replacement of the _____. 236) _____
 A) clutch coil B) reed valves C) shaft seal D) All of these
- 237) Technician A says that when the compressor is replaced, the oil levels should be checked. 237) _____
 Technician B says that the oil from the old compressor can be reused. Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 238) When replacing an air conditioning component, all of the following are true about the refrigerant 238) _____
 oil EXCEPT _____.
 A) The oil removed during refrigerant recovery should be measured
 B) The oil charge stamped on the compressor should be added to the system
 C) The old oil should be drained from the component and measured
 D) The old oil should be replaced with fresh oil
- 239) Technician A says to use caution when removing O-rings so they may be re-used. Technician B says 239) _____
 PAG oil can be used to lubricate O-rings only in systems that use PAG oil as refrigerant lubricant.
 Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 240) Which of the following is the most common cause of compressor failure? 240) _____
 A) Seal failure B) Clutch assembly failure
 C) Inadequate lubrication D) None of these is correct
- 241) Referring to the illustration, what is the state of the coolant in the system? 241) _____



- A) not enough information B) warming up
 C) cooling down D) None of these
- 242) Two technicians are discussing thermostats and coolant circulation. Technician A says that the 242) _____
 coolant does not circulate while the thermostat is closed. Technician B says that the heater doesn't
 blow warm air while the engine is cold because of this. Which technician is correct?
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician

- 243) An electric cooling system fan is controlled by _____. 243) _____
 A) cooling system temperature B) A/C operation
 C) Both A and B D) Neither A nor B
- 244) A hybrid vehicle may have a tendency to have low coolant temperatures. This is due to _____. 244) _____
 A) high system voltage B) vehicle idle-stop feature
 C) Either A or B D) Neither A nor B
- 245) Modern cooling systems are designed to maintain an engine temperature of _____. 245) _____
 A) 150 to 270 °F B) 170 to 300 °F C) 180 to 230 °F D) 100 to 160 °F
- 246) An engine block heater is used on some vehicles in very cold climates in order to _____. 246) _____
 A) decrease fuel milage B) provide faster engine warm up
 C) decrease exhaust emissions D) None of these
- 247) Two Technicians are discussing fan clutches. Technician A says that some fan clutches have a thermostatic valve that allows the clutch to drive the fan when it gets hot. Technician B says that a fan clutch allows a large fan to be used with a lower noise level and power loss. Which technician is correct? 247) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 248) Two technicians are discussing coolant circulation. Technician A says that some modern vehicles use thermosyphon coolant circulation. Technician B says that the coolant flows from one side of the radiator to the other in a crossflow design. Which technician is correct? 248) _____
 A) Technician A only B) Technician B only
 C) Both technicians D) Neither technician
- 249) On most vehicles with a serpentine belt, the belt is tensioned by _____. 249) _____
 A) guide ramps B) a spring loaded tensioner
 C) a slotted adjuster bolt D) changing the belt size
- 250) On most engine blocks, the coolant flow is into the _____. 250) _____
 A) top and out the bottom B) bottom and out the bottom
 C) top and out the top D) bottom and out the top
- 251) Which component releases excess pressure from the cooling system? 251) _____
 A) Heater control valve B) Recovery tank
 C) Radiator cap D) Radiator
- 252) The best amount of ethylene glycol to mix into the coolant is _____. 252) _____
 A) 50% B) 25% C) 75% D) 100%
- 253) A unique feature of a thermosyphon cooling system is that _____. 253) _____
 A) uses no radiator hoses B) it has no radiator
 C) it has no water pump D) None of these

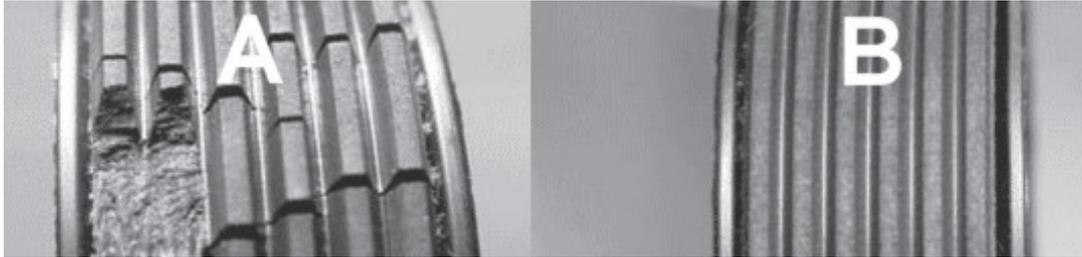
TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 254) A hybrid vehicle may have more than one cooling system. 254) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 255) A 50/50 coolant mixture will provide extra protection against _____. 255) _____
A) hot spots in the engine B) boil-over
C) rust formation D) All of the above

- 256) Which of these two worn belts is a neoprene belt? 256) _____



- A) A B) B
C) Not enough information D) Neither A nor B
- 257) In a modern cooling system, the coolant level is checked at the _____. 257) _____
A) coolant recovery reservoir B) radiator
C) thermostat cover D) None of these
- 258) A pressure gauge is installed on the radiator filler neck and the system pressurized to 15 psi. After a few minutes, the pressure was down to 5 psi according to the gauge on the tester. What is the *least likely* cause? 258) _____
A) A leaking heater core B) A leaking water pump
C) A leaking evaporator D) A leaking radiator hose
- 259) Technician A says that the major cause of engine overheating is a faulty thermostat that opens at a too-high temperature. Technician B says that the bleed notch or jiggle pin should be at the top when installing vertically mounted thermostats. Which technician is correct? 259) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician
- 260) Technician A says that the thermostat test begins with the engine cold. Technician B says that a good thermostat allows coolant to circulate immediately. Which technician is correct? 260) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician
- 261) Technician A says that the fan used with modern RWD vehicles always rotates in a clockwise direction, the same as the crankshaft. Technician B says that the fan clutch used on FWD vehicles can cause fan rotation in either direction. Which technician is correct? 261) _____
A) Technician A only B) Technician B only
C) Both technicians D) Neither technician
- 262) The temperature gauge approaches the red part of the temperature gauge (260 °F or 127 °C) if driven at slow speeds but does not overheat if driven at highway speeds. What is the *most likely* cause? 262) _____
A) Inoperative cooling fan B) Incorrect antifreeze/water mixture
C) Low coolant level D) Defective water (coolant) pump

270) Clutch fans are tested using a(n) _____.
A) ohmmeter B) timing light

C) voltmeter

D) pressure gauge

270) _____