Todays Technician Automotive Heating and Air Conditioning Classroom Manual and Shop Manual Spiral bound Version 6th edition Schnubel Test Bank

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Name:_____ Class:_____ Date:_____

Chapter 02: Temperature and Pressure Fundamentals
Classroom Manual

1. Heat flows from a hot object to an object containing less heat.
   a. True
   b. False
ANSWER: True
POINTS: 1

2. Humidity refers to the amount of heat in the air.
   a. True
   b. False
ANSWER: False
POINTS: 1

3. Heat is removed from the body by the process of evaporation.
   a. True
   b. False
ANSWER: True
POINTS: 1

4. Heat required to turn water into steam is latent heat.
   a. True
   b. False
ANSWER: True
POINTS: 1

5. Gravity causes warm air to sink.
   a. True
   b. False
ANSWER: False
POINTS: 1

6. Specific heat is the same as sensible heat.
   a. True
   b. False
ANSWER: False
POINTS: 1

7. The radiation process is not affected by the surrounding air temperature.
   a. True
   b. False
ANSWER: True
POINTS: 1

8. Air movement increases the body's rate of cooling.

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a. True
b. False
ANSWER: True
POINTS: 1

9. Heat is the absence of cold.
a. True
b. False
ANSWER: False
POINTS: 1

10. As heat energy is added to a liquid, the speed of its molecules increases.
a. True
b. False
ANSWER: True
POINTS: 1

11. How is heat transfer by convection accomplished?
a. Heat travels by infrared rays.
b. Heat travels by radio waves.
c. Heat travels through the surrounding air.
d. The cooler and warmer objects are touching.
ANSWER: c
POINTS: 1

12. *Technician A* says latent heat is hidden heat. *Technician B* says latent heat is required for a change of state. Who is correct?
a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B
ANSWER: c
POINTS: 1

13. Sensible heat can be measured with
a. a pressure gauge. b. a thermometer.
c. a scale. d. all of the above.
ANSWER: b
POINTS: 1

14. All of the following are true of voltage drops EXCEPT:
a. Voltage drop is the conversion of electrical energy into another form of energy.
b. Corrosion in a circuit does not cause a voltage drop.
c. All of the source voltage in a circuit must be dropped.
d. Voltage drop can be measured with a voltmeter.

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ANSWER: b
POINTS: 1

15. All of the following statements about oxygen are true, EXCEPT:
    a. Oxygen makes up 78 percent of the air we breathe.
    b. Oxygen is essential to all animal life.
    c. Oxygen combines readily with other elements to form complex chemicals.
    d. Oxygen is normally a gas.

ANSWER: a
POINTS: 1

16. The word latent means
    a. hot. b. cold.
    c. transfer. d. hidden.

ANSWER: d
POINTS: 1

17. All of the following statements about heat transfer are true, EXCEPT:
    a. Molecular motion is transmitted to molecules that have less motion.
    b. Some of the molecules give up their energy to other molecules that have more energy.
    c. Heat flows from matter at a higher temperature to matter at a lower temperature.
    d. Heat never flows from low-temperature matter to high-temperature matter.

ANSWER: b
POINTS: 1

18. The acceptable comfort range for the human body is:
    a. 45-50 percent relative humidity b. 72°F-80°F
    c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

19. The sun heats the earth through the process of
    a. convection. b. conduction.
    c. radiation. d. all of the above.

ANSWER: c
POINTS: 1

20. *Technician A* says sensible heat can be measured. *Technician B* says specific heat is the amount of heat required to change one pound of a substance by 1°F. Who is correct?
    a. Technician A only b. Technician B only
    c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

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21. *Technician A* says convection may occur in liquids and gases. *Technician B* says conduction can occur between two substances that are at different temperatures. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

22. The ideal relative humidity is between ____ and ____ percent.

a. 10, 100 b. 20, 80
c. 30, 70 d. 40, 60

ANSWER: d
POINTS: 1

23. One British thermal unit (Btu) contains ____ calories.

a. 144 b. 212
c. 252 d. 970

ANSWER: c
POINTS: 1

24. *Technician A* says latent heat cannot be felt. *Technician B* says latent heat cannot be measured with a thermometer. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

25. The metric term for pressure (psi) is

a. Kilogram (kg). b. KiloPascal (kPa).
c. Liter per millimeter (Lm). d. Liter per centimeter (Lc).

ANSWER: b
POINTS: 1

26. *Technician A* says convection is the process of heat moving to cold. *Technician B* says convection also involves the movement of heat upwards. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

27. Evaporation is being discussed. *Technician A* says heat is lost when evaporation occurs. *Technician B* says the rate of evaporation is not affected by air movement. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

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ANSWER: a
POINTS: 1

28. A change in pressure can affect the _____ of a substance.
a. vaporization b. toxicity
c. condensation d. Both A & C
ANSWER: d
POINTS: 1

29. All of the following are gas laws, except:
a. Charles' Law b. Darwin's Law
c. Dalton's Law d. Boyle's Law
ANSWER: b
POINTS: 1

30. The heat added to a vapor causing it to become warmer is called:
a. Latent heat b. Sensible heat
c. Superheat d. Specific heat
ANSWER: c
POINTS: 1

31. Constant removal of body heat takes place by three processes. Name them.
ANSWER: Convection, radiation, and evaporation (any order)

POINTS: 1

32. Explain what happens to molecules at absolute zero (–459.67°F).
ANSWER: The molecules would have no motion (movement).
POINTS: 1

33. What are the three basic terms used to describe the three types of heat?
ANSWER: Sensible, latent, and specific heat (any order)

POINTS: 1

34. What are the three states of matter?
ANSWER: Solid, liquid, and gas (any order)

POINTS: 1

35. What is the heat that causes a change of state but cannot be measured on a thermometer called?
ANSWER: latent
POINTS: 1

36. What is the unit of measurement used to measure latent heat?

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ANSWER: The unit of measurement used to measure latent heat is the British thermal unit (Btu).
POINTS: 1

37. What unit of measurement is resistance in an electrical circuit meased in?
ANSWER: Ohm's
POINTS: 1

38. What is the major difference between evaporation and boiling?
ANSWER: The molecules of a boiling liquid are converted to a vapor at a much faster rate than during evaporation.
POINTS: 1

39. Define specific heat.
ANSWER: Specific heat is the amount of heat required to raise the temperature of a particular material. The specific heat of every material is different.
POINTS: 1

40. Identify the components of a molecule of water. Explain why the water molecule differs from its component elements.
ANSWER: A water molecule consists of two atoms of hydrogen and one atom of oxygen. The combination of two elements, both gas ions in their natural state, produces a liquid that is unlike either.
POINTS: 1

41. List some air conditioning service equipment that is usually supplied by the shop.
ANSWER: Refrigerant recovery/recycle system, electronic leak detector, electronic thermometer, charging station, ATC testers, compressor repair tools
POINTS: 1

42. Briefly define Charles' Law.
ANSWER: The volume of a fixed mass of gas held at a constant pressure varies directly with a change in the absolute temperature. And conversely, when a gas is held at a constant volume, its pressure varies directly with the absolute temperature.
POINTS: 1

43. Briefly define Dalton's Law.
ANSWER: The total pressure of a confined mixture in a sealed container is equal to the sum of the pressures of each gas in the mixture.

POINTS: 1

44. Briefly define Boyle's Law.
ANSWER: The volume of a gas varies inversely with the absolute pressure at a constant temperature.
POINTS: 1

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Name:_____ Class:_____ Date:_____

Chapter 02: Typical Shop Procedures and Tools
Shop Manual

1. No special equipment is required to service HFC-134a (R-134a) refrigerant systems.
   a. True
   b. False
ANSWER: False
POINTS: 1

2. Vacation time is considered a fringe benefit.
   a. True
   b. False
ANSWER: True
POINTS: 1

3. Because of the shortage of technicians habitual lateness is often tolerated.
   a. True
   b. False
ANSWER: False
POINTS: 1

4. OSHA was established to improve workers wages.
   a. True
   b. False
ANSWER: False
POINTS: 1

5. A vacuum pump is used to remove refrigerant from the system.
   a. True
   b. False
ANSWER: False
POINTS: 1

6. A halide leak detector is the best type to use to locate hard to find refrigerant leaks.
   a. True
   b. False
ANSWER: False
POINTS: 1

7. A shop that services refrigerant systems does not have to have a refrigerant recovery and recycling system.
   a. True
   b. False
ANSWER: False
POINTS: 1

8. A dual channel recovery system can recover either refrigerant or antifreeze.

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a. True
b. False
ANSWER: False
POINTS: 1

9. MACS stands for Modern Automotive Control Systems.
a. True
b. False
ANSWER: False
POINTS: 1

10. Service procedures generally provide information in a step-by-step sequence based on manufacturer recommendations.
a. True
b. False
ANSWER: True
POINTS: 1

11. *Technician A* says as an employee your obligation is to be a loyal, caring individual, and have the ability to follow directions. *Technician B* says that you are not entitled to a clean, safe place to work. Who is correct?
a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B
ANSWER: a
POINTS: 1

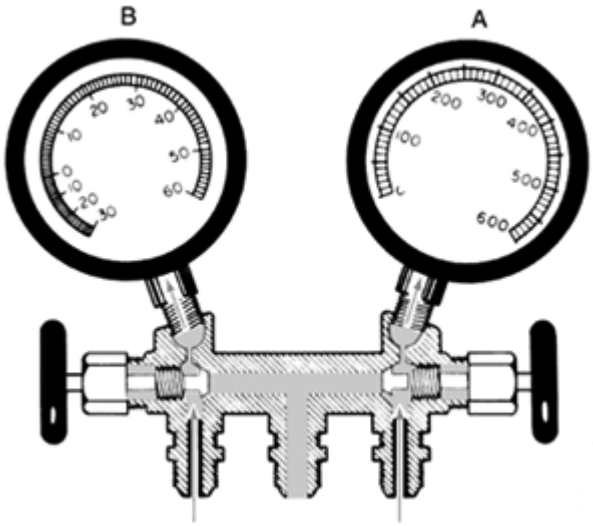
12. *Technician A* says to use the VIN to collect the correct repair information. *Technician B* says repair procedures will cover diagnostic routines and methods to perform the repair. Who is correct?
a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B
ANSWER: c
POINTS: 1

13. Refrigerant identifiers are being discussed. *Technician A* says a refrigerant identifier will display R-12 if the refrigerant is 90% CFC-12 by weight. *Technician B* says a refrigerant identifier will display R-134a if the refrigerant is 98% HFC-134a by weight. Who is correct?
a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B
ANSWER: b
POINTS: 1

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Chapter 02: Typical Shop Procedures and Tools
Shop Manual

14. 

The tool in the figure above is being discussed. *Technician A* says the "B" gauge will register vacuum in Hg as well as psig. *Technician B* says the "A" gauge will register pressure in psig. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

15. *Technician A* says that when working on a refrigerant system you should work in a well-ventilated area. *Technician B* says to determine the type of refrigerant used in a system, a refrigerant identifier should be used prior to servicing the vehicles refrigerant system. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

16. *Technician A* says a manifold and gauge sets is a manifold block complete with gauges and charging hoses. *Technician B* says a can tap is a device used to pierce, dispense, and seal small cans of refrigerant. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

17. *Technician A* says a service information system may include estimating and shop management software. *Technician B* says service information you find on the internet is the most accurate information. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: a
POINTS: 1

18. *Technician A* says a vacuum pump is an essential piece of equipment for servicing a refrigerant system. *Technician B* says that you only need one manifold gauge set for all types of refrigerant you need to service. Who is correct?

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a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: a
POINTS: 1

19. *Technician A* says shops must have dedicated manifold and gauge sets for each manufacturer-approved refrigerant. *Technician B* says a shop should also have an additional set for contaminated refrigerant. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: c
POINTS: 1

20. *Technician A* says that a repair order does not need to be filled out for a no charge (free) repair. *Technician B* says that the repair order is a legal document that must be filled out for every vehicle worked on. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: b
POINTS: 1

21. All of the following are basic employee obligations that must be adhered to EXCEPT:

a. Positive attitude b. Responsibility and pride
c. Dependability d. Tardiness

ANSWER: d
POINTS: 1

22. Refrigerant identifiers are being discussed. *Technician A* says the identifier will identify CFC-12 (R-12) and HFC-134a (R-134a) by name. *Technician B* says the identifier will not indicate the presence of flammable gases. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: a
POINTS: 1

23. *Technician A* says the high-side gauge on the manifold gauge set is on the left and has a red housing. *Technician B* says the low-side gauge on the manifold gauge set is on the left and has a green housing. Who is correct?

a. Technician A only b. Technician B only
c. Both A and B d. Neither A nor B

ANSWER: d
POINTS: 1

24. All of the following are method of detecting refrigerant leaks EXCEPT:

a. Halogen detector b. Soap solution
c. hepide detector d. Fluorescent dye

ANSWER: c

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POINTS: 1

25. All of the following are sources of repair information about automotive refrigerant systems EXCEPT:
a. ALLDATA b. EPAC
c. iATN d. MACS
ANSWER: b
POINTS: 1

26. Which of the following terms is used to refer to a vehicle that must return to a repair facility for a repeat repair.
a. back-job b. repeater
c. bad one d. come-back
ANSWER: d
POINTS: 1

27. What is your employer expected to supply first and foremost?
ANSWER: A safe and clean place to work
POINTS: 1

28. What must a shop have for tools in addition to technician's tools for refrigerant service?
ANSWER: In addition to the technician's tools needed to perform refrigerant service, the shop must have the required refrigerant recovery, recycle, and recharge systems for all refrigerant types serviced at their facility.
POINTS: 1

29. What is a manifold and gauge set?
ANSWER: A manifold and gauge set is a manifold block complete with gauges and charging hoses used to check and service refrigerant gas in an air conditioning system.
POINTS: 1

30. What are the four basic employee obligations?
ANSWER: Attitude, responsibility, dependability, pride (any order)

POINTS: 1

31. List three special service tools besides the manifold and gauge set that will expand your service and repair capabilities considerably.
ANSWER: Thermometer, leak detector, vacuum pump (any order)

POINTS: 1

32. What does the acronym VIN stands for?
ANSWER: Vehicle identification number.
POINTS: 1

33. What is the purpose of the refrigerant recovery, recycling, and recharging equipment SAE standard J2788H?
ANSWER: It is designed to avoid refrigerant oil cross contamination.

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POINTS: 1

34. List some other air conditioning service equipment that is usually supplied by the shop.
ANSWER: Refrigerant recovery/recycle system, electronic leak detector, electronic thermometer, charging station, ATC testers, compressor repair tools, vacuum pump, refrigerant identifier, and an electronic scale.
POINTS: 1

35. Explain why it is important to consult service information when working on any type of air conditioning system.
ANSWER: The vast number and variety of modern air conditioning systems make it impossible to give a standard repair procedure.
POINTS: 1

36. Why are shop rules and regulations put in place?
ANSWER: Shop rules and regulations are put in place by management to create and maintain a safe and pleasant environment for both employees and customers.
POINTS: 1

37. What is a manifold and gauge set?
ANSWER: A manifold and gauge set is a manifold block complete with gauges and charging hoses used to check and service refrigerant gas in an air conditioning system.
POINTS: 1

38. How are the R-1234yf recovery/recycling/recharge equipment requirements different from R-134a?
ANSWER: The refrigerant equipment for R-1234yf meets the same stringent charging and recover requirements as the R-134a J2788 systems but also includes the mandatory use of a refrigerant identifier prior to recovery of refrigerant.
POINTS: 1

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