Chapter 16, 17 & 18 Test Review

51. Work may be done by
    a. a force acting on an object and causing the object's particles to compress closer together
    b. a force causing an object to move
    c. a force acting against an object that will not move
    d. an object that is absolutely still

52. When the temperature of water is raised from 0 ^{o}C to 100 ^{o}C, the water
    a. contracts only
    b. expands and then contracts
    c. contracts and then expands
    d. expands only

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53. An increase in the heat content of a body of matter also means an increase in
    a. temperature
    b. molecular motion
    c. kinetic energy
    d. mass

54. Convection currents are the result of
    a. expansion of each individual molecule in heated solids
    b. increases in the density of solids as a result of heating
    c. colder, denser portions of fluids sinking through warmer, less dense portions
    d. the lack of heat transfer between solids and liquids

55. The liquid in a thermometer rises when it gets warmer because ....
    a. the particles of the liquid gain kinetic energy
    b. the particles of the liquid lose kinetic energy
    c. the particles of the liquid contract
    d. the particles of the liquid move farther apart

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56. Thermal expansion is related to
    a. cooling
    b. the speeding up of molecular vibrations
    c. a decrease in kinetic energy
    d. a decrease in the space between molecules

57. An example of a good conductor is
    a. glass b. aluminum c. wood d. plastic

58. Water <u>expands</u> as it cools from
    a. 16 ^{o}C to 12 ^{o}C b. 12 ^{o}C to 8 ^{o}C c. 8 ^{o}C to 4 ^{o}C d. 4 ^{o}C to 0 ^{o}C

59. The relationship between heat and motion was investigated by
    a. Rumford b. Kelvin c. Joule d. Celsius

60. Temperature is not
    a. related to heat
    b. the same thing as heat
    c. a measure of the energy of motion.
    d. related to the motion of molecules

61. Count Rumford concluded that heat production was <u>not</u> related to
    a. drilling b. a substance called "caloric" c. work being done d. energy

62. Energy from the sun reaches the earth by
    a. convection b. radiation c. conduction d. transpiration

63. Explosions of gases may be caused by
    a. the expansion of the gases
    b. the increase in temperature of the gases
    c. the increase in molecular motion of the gases
    d. loss of kinetic energy by the particles of the gases

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64. Higher temperatures indicate

    a. slower motion of molecules
    b. stored energy only
    c. faster motion of molecules
    d. molecules at rest

65. During a phase change, there is always

    a. no change in temperature
    b. a decrease in heat energy
    c. a change in temperature
    d. a change in heat energy

66. Energy is <u>not</u> transferred
    a. from cold to hot b. by convection c. by conduction d. by radiation

67. Specific heat of a substance equals the
    a. heat gained or lost
    b. number of calories needed to raise the temperature of 1 g of the substance 1 ^{o}C
    c. heat gained or lost divided by mass times the temperature in ^{o} C
    d. heat gained or lost times the temperature in ^{o} C

68. Heat energy is transferred through solids by ...
    a. conduction b. convection c. radiation d. evaporation

69. The operation of a bimetallic strip is based on the principle of
    a. phase change b. thermal expansion c. heat of fusion d. heat of vaporization

70. The temperature at which a large quantity of a substance rapidly begins changing from a liquid phase to a gas phase is its
    a. freezing point b. heat of fusion c. boiling point d. heat of vaporization

71. As molecules move in the currents of fluids, heat is transferred by
    a. conduction b. radiation c. convection d. conduction and radiation

72. Wood and plastic are used as handles on pots because they are
    a. conductors b. insulators c. convectors d. noncombustible

73. The amount of heat needed to change the temperature of a piece of matter depends on the ...
    a. specific heat of the matter
    b. force of the matter
    c. mass of the matter
    d. velocity of the matter

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74. A substance gains <u>internal</u> <u>energy</u> when it
a. absorbs energy b. loses energy c. cools off d. heats up

76. The diagrams below represent pictures of one of the expansion joints in a northern Michigan bridge. One of the pictures was taken in the middle of January and the other was taken in the middle of July. Why are the pieces of the expansion joint farther apart in Fig. Q?

a. the bridge got colder and expanded
b. the bridge got hotter and expanded
c. the bridge got colder and contracted
d. the bridge got hotter and contracted

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Fig. P

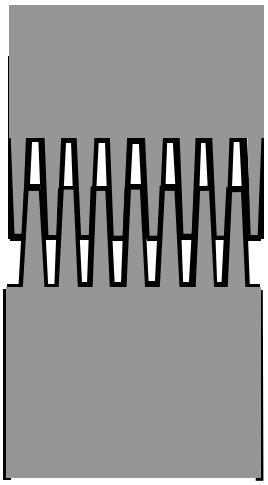
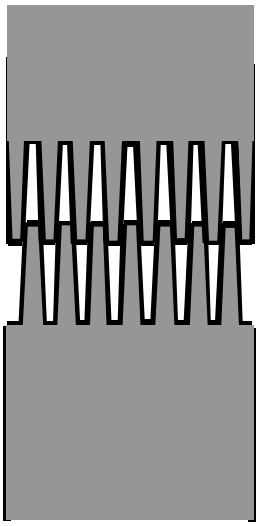


Fig. Q



77. The diagrams below and to the right represent pictures of a pair of northern Michigan utility poles with electrical power lines strung between them. One picture was taken during July and the other was taken during January. Why are the lines sagging in Fig. R?

a. The lines in Fig. R are warmer than they are in Fig. S
b. The lines in Fig. R are colder than they are in Fig. S
c. The lines in Fig. R have expanded compared to Fig. S
d. The lines in Fig R have contracted compared to Fig. S

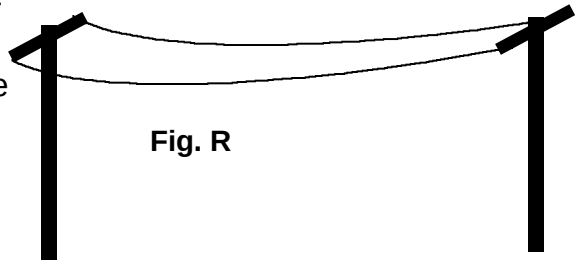


Fig. R

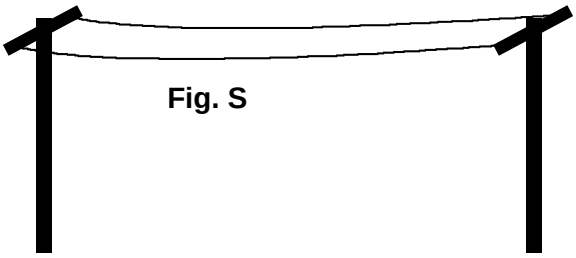


Fig. S

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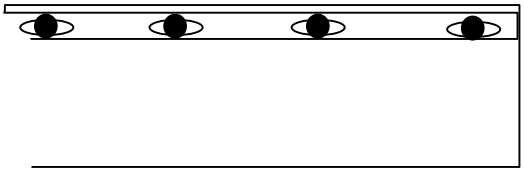
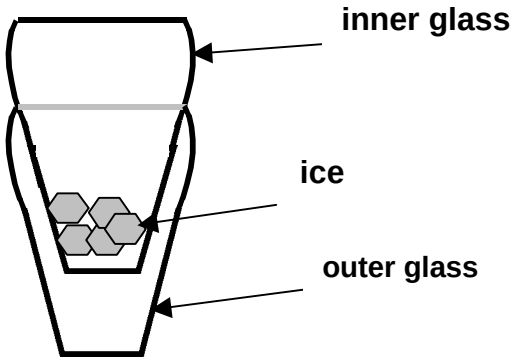
78. The diagram below represents a piece of vinyl or aluminum house siding before it is installed on a house. The ovals represent holes for the nails used to attach the siding to the house. The large black dots represent nail heads. **What would happen if the holes were exactly the same size as the nail?**



a. The siding might buckle or wrinkle if it warms up.
b. The siding might break or pull loose from the nails if it cools too much.
c. The siding will fit the house better if the holes are the same size as the nails.
d. The siding will not stay on the house if the holes are not the same size as the nails.

79. The diagram to the right shows two glasses, one stacked inside the other. The inner glass contains ice. The outer glass was empty prior to stacking the other glass inside it. Two hours after the glasses were stacked, a person washing the dishes discovered that they were "stuck" firmly together. **How can the glasses be separated easily without breaking either of them?**



a. by putting the bottom glass in ice water
b. by putting the bottom glass in hot water
c. by putting hot water in the top glass
d. by putting ice in the top glass

Questions 80 through 89 are about the Thermal Expansion Labs:

80. If the water in the flask was already hot when you put a new (cool) pipe on the board, what would be the effect on the cm ruler reading?
   a. The pointer would not turn at all.
   b. The reading would be more.
   c. The pointer might move backwards
   d. The reading would be less
   e. The reading would not be affected.

81. One group reported that **none** of their tubes moved the pointer more than 5 millimeters. *What could have caused the low readings?*
   a. the pointer could have been touching something
   b. the tubes could have been hot already
   c. they shut the heat off before steam passed through the tubes
   d. the clamp might not have been tight
   e. the tube might have been heated for too long
   f. the tubes were too cold when they started

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82. What caused the pointer to move to the right during most of the tests?
    a. the weight of the pointer
    b. the pressure of the steam
    c. the tubes were getting longer
    d. the tubes were getting shorter
    e. the tubes were heating up
    f. the tubes were cooling off

83. If the hook at the end of the pipe was loose, what would be the effect on the cm ruler reading?
    a. The pointer would not move at all.
    b. The pointer reading would be more.
    c. The pointer might move backwards
    d. The pointer reading would be less
    e. The pointer reading would not be affected.

84. If the pipe was still hot when assembled to the apparatus what would be the effect on the cm ruler reading?
    a. The pointer would not move at all.
    b. The pointer reading would be more.
    c. The pointer might move backwards
    d. The pointer reading would be less
    e. The pointer reading would not be affected.

85. If you put the aluminum pipes in a freezer at - 20^{o}C for 30 minutes before conducting the experiment what would be the effect on the cm ruler reading?
    a. The pointer would not move at all.
    b. The pointer reading would be more.
    c. The pointer might move backwards
    d. The pointer reading would be less
    e. The pointer reading would not be affected.

86. If the clothespin clamp was not tight during the experiment, what would be the effect on the cm ruler reading?
    a. The pointer would not move at all.
    b. The pointer reading would be more.
    c. The pointer might move backwards
    d. The pointer reading would be less
    e. The pointer reading would not be affected.

87. How did the final temperature of each tube compare at the end of the required heating time?
    a. The aluminum tubes were hottest.
    b. The brass tube was hottest.
    c. The glass tubes were hottest.
    d. All of the tubes were the same temperature.
    e. None of the tubes got above 20^{o}C

88. Rank the tube materials in order of the most expansion to the least expansion.
    a. brass, aluminum, flint glass, borosilicate glass
    b. flint glass, borosilicate glass, brass, aluminum
    c. aluminum, brass, borosilicate glass, flint glass
    d. aluminum, brass, flint glass, borosilicate glass

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89. Which will expand the most if all are heated the same amount of degrees with the same heat source?
    a. gas b. solid c. liquid

90. The usefulness of internal combustion engines depends on which of the following?
    a. heat energy
    b. thermal expansion
    c. energy conversion from one form to another
    d. chemical potential energy

91. Fiberglass insulation helps block the transfer of heat by **conduction** because…
    a. it melts easily
    b. it doesn't melt easily
    c. glass is a good conductor of heat
    d. glass isn't a good conductor of heat

92. Fiberglass insulation helps block the transfer of heat by **convection** because…
    a. it is filled with tiny pockets of air that prevent currents of air
    b. it is made of tubes filled with an antifreeze mixture
    c. glass flows in currents especially at very low temperatures
    d. glass produces enough heat all by itself to prevent convection currents

93. The goose "down" in jackets, coats & vests is good insulation because…
    a. it is filled with tiny pockets of air that prevent currents of air.
    b. it is made of tubes filled with an antifreeze mixture.
    c. feathers are very light and absorb heat easily.
    d. feathers generate heat without anything else being involved.

94. Double or triple pane windows are better insulation than single pane windows because…
    a. they provide "dead" air space that prevents heat transfer by convection currents.
    b. they provide more direct contact between the outside air and the inside air.
    c. they provide more glass for a barrier against heat transfer by conduction.
    d. they provide more strength for the house.

95. What phase change takes place in the refrigerant pipes in the freezer unit of a refrigerator?
    a. vaporization b. sublimation c. freezing d. melting e. condensation

96. What phase change takes place in the compressor unit of a refrigerator?
    a. vaporization b. sublimation c. freezing d. melting e. condensation

97. What is the substance called that absorbs the heat from the inside of a freezer and releases it outside of the freezer?
    a. solvent b. refrigerant c. solute d. desiccant