ACTIVITY # 13.1 EFFECTS OF HEAT Date due:_____

1. Expansion and contraction occurs in _____.

A. solid B. liquid C. gases D. all three states of matter

2. The figure below shows a metal ball and ring. At room temperature, the ball is able to pass through the ring. What would happen if the ball is heated?

A. The metal ball passes through the ring.
B. The metal ball gets stuck in the ring.
C. The metal ball shrinks.
D. The metal ball melts.

3. When an object expands, its _____ increases.

I. Length II. Size III. Volume IV. Density

A. I and II only B. II and III only C. II,III, and IV only D. all of the above

4. Which of the following would expand the least?

A. iron rod B. perfume C. water D. liquid nitrogen

5. Which of the following explains why there are gaps in railway lines?

A. To allow people to cross through the gaps
B. To regulate the speed of the trains
C. To allow for the expansion and contraction of the railway lines
D. To allow the railway lines to be easily dismantled

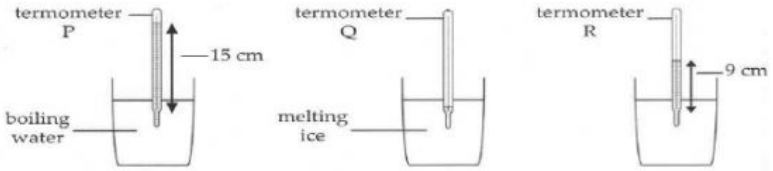
6. In which of the following types of thermometers does unequal expansion occur?

A. clinical thermometers
B. bimetallic thermometers
C. mercury thermometers
D. infrared thermometers

7. Expansion and contraction are _____changes.

A. chemical B. unequal C. physical D. temperature

8. The figure below shows three mercury thermometers. Thermometer P is immersed in boiling water and thermometer Q is immersed in melting ice.



What is the temperature shown on thermometer R?

A. 115 °C B. 91°C C. 75 °C D. 60 °C

9. Gases expand more on heating than liquids or solids because _____.
   A. gas particles are smaller than liquid and solid particles
   B. gas particles absorbs more heat than liquid and solid particles
   C. gas particles have more space to move
   D. all of the above

10. Expansion and contraction can produce a large _____.
   A. movement B. force C. pressure D. energy

11. Which of the following is NOT an effect of expansion?
   A. fragrance spreading across a room
   B. buckling of railway lines
   C. sagging of overhead cables
   D. riveting of metal sheets together

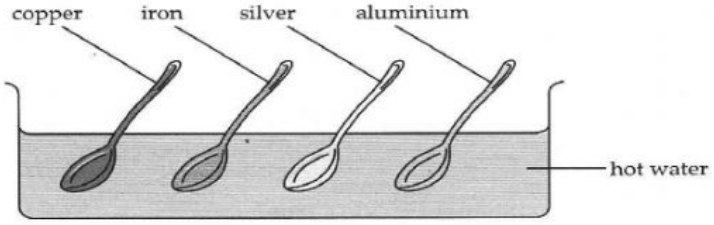
12. Which of the following will not change when a glass marble is placed in a container of boiling water?
   A. size B. density C. volume D. mass

13. Four metal rods were used in an experiment to investigate the effect of heat on them. The table below shows the results of the experiment. At the start of the experiment, each metal rod measured 8 cm in length.

Metal rod	Length of rod at the end of the experiment (cm)
W	8.05
X	8.13
Y	7.96
Z	8.02

Which metal rod was most likely placed inside a refrigerator?
A. W B. X C. Y D. Z

14. Eric conducted an experiment to find out which material was a better conductor of heat. He placed four identical spoons made of silver, copper, aluminum and iron into a beaker of very hot water.

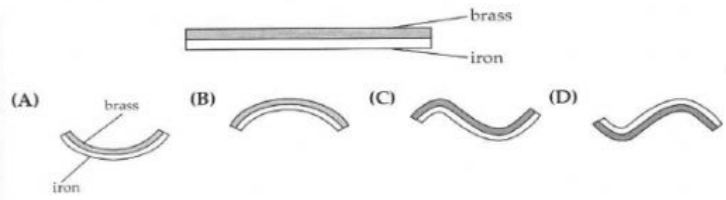


Rank the spoons from the best to the worst conductor of heat.

A. copper, silver, iron, aluminum
B. silver, iron, copper, aluminum
C. copper, iron, aluminum, silver
D. silver, copper, aluminum, iron

ACTIVITY # 13.2 BIMETALLIC STRIPS Date due:_____

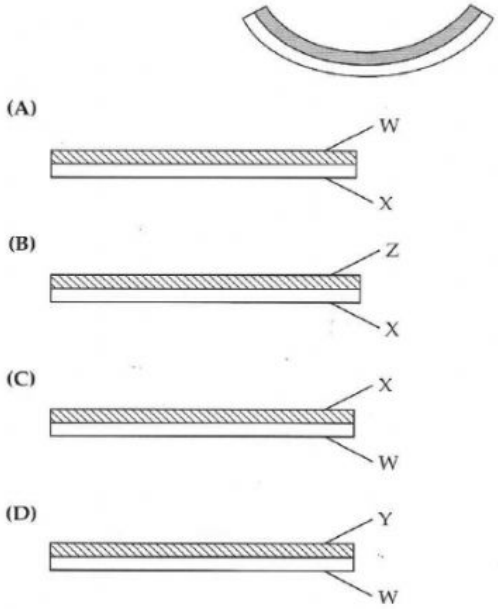
1. A bimetallic strip is made of two different metals (usually iron and brass) joined together. Which of the following correctly shows how the strip would bend when heated?



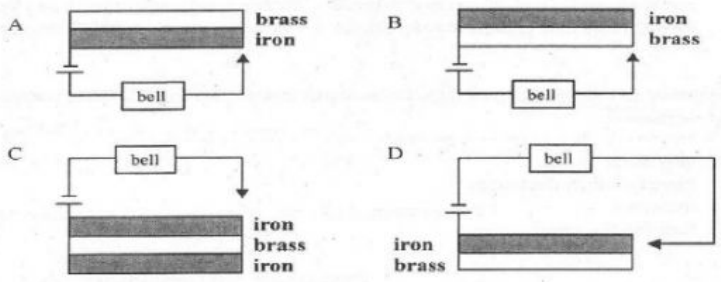
2. Four metal rods were used in an experiment to investigate the effect of heat on them. The table below shows the results of the experiment. At the start of the experiment, each metal rod measured 8 cm in length.

Metal rod	Length of rod at the end of the experiment (cm)
W	8.05
X	8.13
Y	7.96
Z	8.02

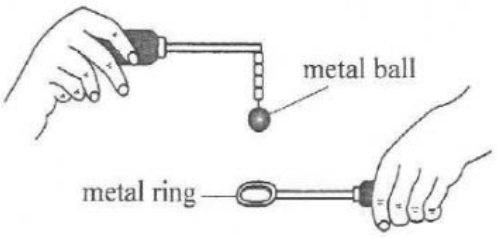
A bimetallic strip was made of two metals used in the experiment. The figure below shows how the strip bent when cooled. Which of the diagrams below correctly shows the combination of the metals used in the bimetallic strip?



Which circuit arrangement of the bimetallic strip will cause the alarm bell to ring in the event of a fire or a temperature increase?



A student uses the apparatus shown to investigate the effect of heat on a state of matter.



At room temperature the ball is able to pass through the ring.

The student then strongly heats the ball using a Bunsen burner for a few minutes.

(i) State what happens to the metal ball after it is heated.

_____ [1]

(ii) State what happens when the student tries to reinsert the ball into the ring immediately after heating the ball.

_____ [1]

(iii) Explain your answer to (ii) using the kinetic theory.

_____

_____

_____ [2]

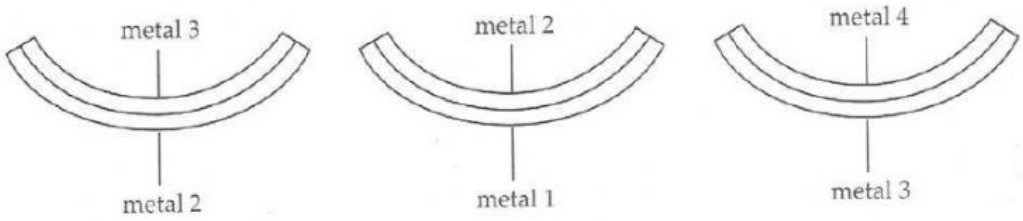
(iv) The ball is at room temperature and the ring is cooled in liquid ammonia.

Explain what happens when the student tries to reinsert the ball into the ring.

_____

_____ [1]

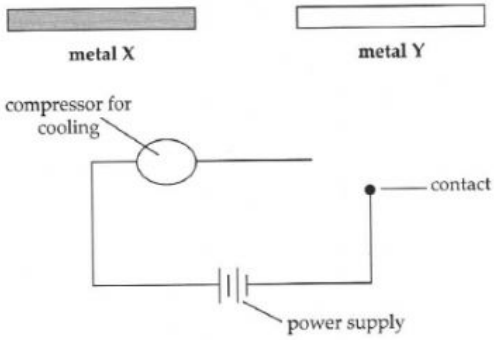
5. Betty's science teacher gave them three heated bimetallic strips. The compositions of the strips are shown in the diagram below.



Rank the metals according to the rate of expansion, from the slowest to the fastest.

_____

6. A circuit diagram of a refrigerator is shown below. Given that metal X expands more than metal Y, show on the diagram how metals X and Y should be used.



a. Explain how the thermostat in a refrigerator works.

_____

_____

_____

b. How is the thermostat's function in an electric iron different from its function in (a) ?

_____

_____

_____