Questions 1 – 3 refer to the following situation:

Two people decide to share a sugar-sweetened soft drink. The soft drink is divided equally into two glasses. Person B adds an equal amount of water to his glass.

Diagram:

Glass A Glass B

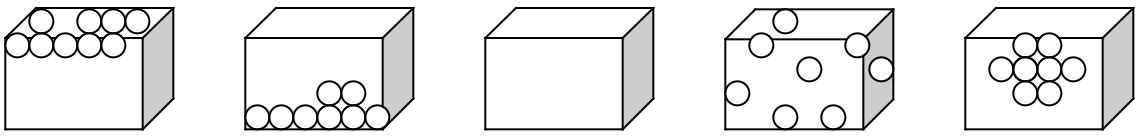
1. Which glass contains the sweeter tasting drink?
   (A) Glass A
   (B) Glass B
   (C) Glass A and Glass B contain drinks that are equally sweet.
   (D) Can't tell from the information given.

2. Which glass contains more sugar?
   (A) Glass A
   (B) Glass B
   (C) Both glasses contain equal amounts of sugar.
   (D) Can't tell from the information given.

3. Which glass will provide more energy from the drink in it?
   (A) Glass A
   (B) Glass B
   (C) Both Glass A and Glass B will provide the same amount of energy.
   (D) There is not enough information to tell.

Questions 4 and 5 refer to the following:

A strong perfume is sprayed in the center of a sealed room.



(A) (B) (C) (D) (E)

4. Which of the following diagrams represent the distribution of perfume particles….. The instant the perfume is sprayed?
   (A) A (B) B (C) C (D) D (E) E

5. Which of the following diagrams represent the distribution of perfume particles after several hours after the perfume had been sprayed?
   (A) A (B) B (C) C (D) D (E) E

Questions 6 – 8 refer to the following story:

The evening before a birthday party, several balloons are filled with helium gas . The birthday party occurs on a hot summer day.

6. The next day some of the balloons have burst! They burst because
   (A) The helium particles got bigger.
   (B) The space between the helium particles increased
   (C) A and B are the correct reasons.
   (D) B and C are the correct reasons.

7. The next day the balloons made of latex became smaller. This is because
   (A) Some of the helium particles escaped through pores in the latex.
   (B) The helium particles became smaller.
   (C) The helium particles compressed each other as they moved.
   (D) None of the above explains it.

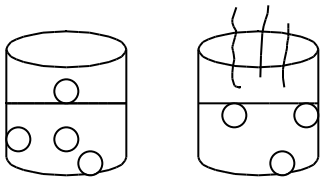
8. A guest at the party dives in the swimming pool holding an inflated balloon! When she gets to the bottom of the pool, the balloon
   (A) becomes smaller.
   (B) becomes bigger.
   (C) does not change in size.
   (D) does not submerge with the diver.

9. A candle is lit in a closed room. After an hour, which of the following statements is true?
   (A) Part of the candle no longer exists.
   (B) The candle melted and is found at the base of the candle.
   (C) The candle was converted to energy.
   (D) The material that "disappeared" is dispersed throughout the room.

10. A sugar cube is added to a hot cup of coffee. What happens to the sugar particles?
   (A) They cease to exist.
   (B) They spread out through the hot coffee..
   (C) They melt in the hot coffee
   (D) They formed a new and different type of substance with the coffee.

11. A glass is half-filled with water at room temperature. Then some ice cubes are added to the water. Very soon, water droplets appear on the outside surface of the glass. Why does this happen?
   (A) Water leaked out of the glass when ice cubes were added to it.
   (B) The ice-water mixture cools the air, causing it to condense on the glass surface.
   (C) Water in the air condenses on the cold surface of the glass.

Questions 12 –14 refer to:the diagrams below of water boiling.

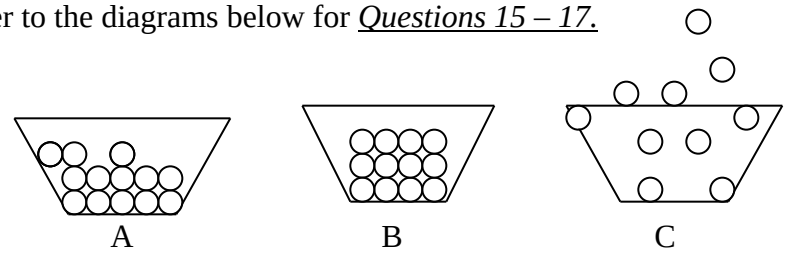


12. Water inside a beaker is heated until it boils. While the water boils, the temperature of of the water
    (A) increases.
    (B) decreases.
    (C) does not change

13. The bubbles that form when the water boils
    (A) contain nothing.
    (B) are bigger water particles
    (C) are air bubbles
    (D) are water vapor
    (E) hydrogen gas and oxygen gas.

14. While the water boils, some salt is added to it. Which of the following statements is true?
    (A) This causes the water to stop boiling and cools it down.
    (B) This causes the water to boil at a higher temperature
    (C) This causes the water to boil at a lower temperature
    (D) This doesn't have any effect on the boiling water.

Refer to the diagrams below for *Questions 15 – 17.*

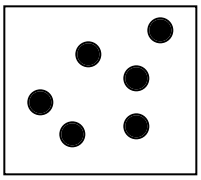


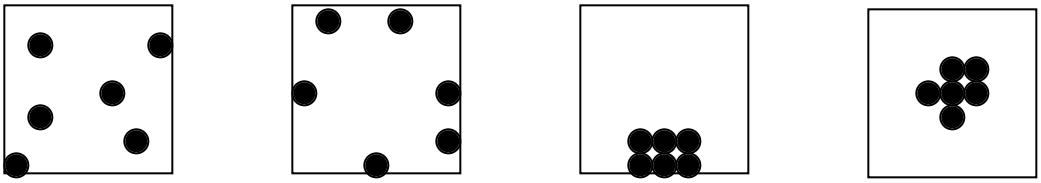
15. Which represents a solid?
    (A) A (B) B (C) C (D) None of the these.

16. Which represents a gas?
    (A) A (B) B (C) C (D) None of the these.

17. Which represents a liquid?
    (A) A (B) B (C) C (D) None of the these.

18. The figure to the right represents a schematic view of helium gas at 25 ^{o}C. (77 ^{o}F) From the diagrams below, select the one which represents a view of helium gas at –10^{o} C. (14 ^{o}F)

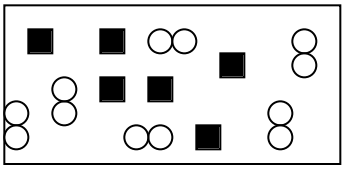




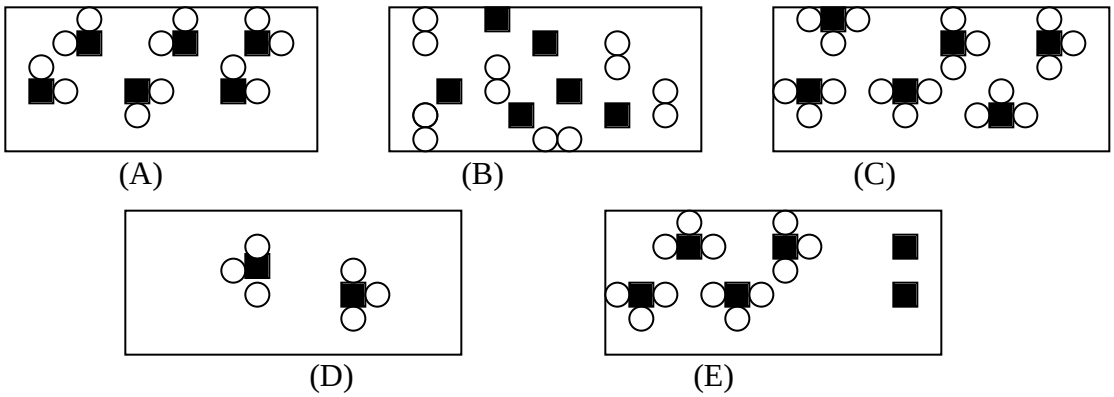
(A) (B) (C) (D)

19.. The equation for a reaction is $2\ S + 3\ O_2$ ------→ $2\ SO_3$

Consider a mixture of S (■) and O_2 (○○) in a closed container as illustrated to the right.



Which of the following diagrams represents the product mixture?



(A) (B) (C) (D) (E)

20. Several cubes of ice are added to a warm drink to make the drink cold. This is because
(A) ice is a good conductor of heat.
(B) ice is a poor conductor of heat.
(C) ice releases coldness when it melts.
(D) ice absorbs heat when it melts.

21. Several cubes of ice are added to a warm drink. After a few minutes the ice is almost gone and the temperature of the drink is
(A) lower than before the ice was added to it.
(B) higher than before the ice was added to it.
(C) the same as that of the ice.
(D) impossible to tell.

22. You take a swim in the swimming pool. Although it is a hot day when you come out, you feel cold. Which of the following statements is TRUE?
    (A) The water in the pool is warmer than the air.
    (B) The water in the pool is colder than the air.
    (C) The water on your skin gets cold when you step out of the pool.
    (D) The water on your skin evaporates.

23. After a few years of circulation a copper penny is no longer shiny. Which of the following statements best explains the reason for this?
    (A) People have dirty hands.
    (B) Copper attracts dirt.
    (C) Copper reacts with the air.
    (D) Copper absorbs the pollution in the air.

24. A gold necklace is always shiny. This is because
    (A) people are more careful handling gold.
    (B) gold repels dirt.
    (C) gold does not easily react with the air.
    (D) gold is valuable.

Questions 25 –26 refer to the following diagrams of solids below. The objects have equal masses and equal volumes.

A B C D

25. Which object has the greatest density?
    (A) A
    (B) B
    (C) C
    (D) D
    (E) None of these.

26. Object B sinks in water. If object B is cut in half and one piece is put in water, which of the following statements is true?
    (A) The piece sinks in water.
    (B) The piece floats in water.
    (C) The piece neither sinks or floats.
    (D) One can't tell how the piece will behave.

Questions 27 –29 refer to the following situation.

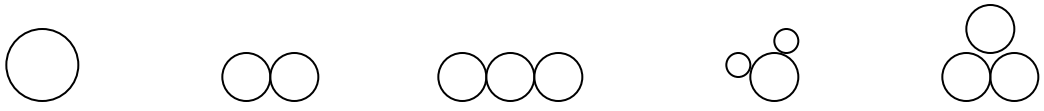
An acid and a base react to form a salt and water. To determine the point at which there is neither an excess of acid nor base, a color indicator is used. A particular indicator is colorless in the presence of excess acid, and pink in the presence of excess base. The more basic the solution the more intense is the pink color.

27. Ninety nine (99) mL of a strong base are added to thirty three (33) mL of a strong acid. At this point, the solution has a light pink color. Which of the following is true about the solution?
    (A) The solution is very basic.
    (B) The solution contains mostly salt and water.
    (C) The solution is very acidic.
    (D) One cannot tell from the information given.

28. Suppose thirty three (33) mL of the same acid are added to thirty three (33) mL of the same base. The result is
    (A) The solution will be very acidic.
    (B) The solution will be very basic
    (C) The solution will be neither acidic nor basic.
    (D) The solution will be very pink.

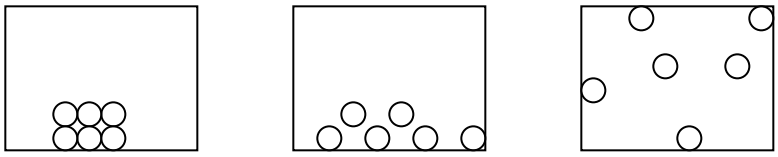
29. A student puts thirty (30) mL of the same base in a flask and adds the color indicator. The basic solution is pink. The student then adds the same acid to it. Approximately how many mL of the acid will be needed to turn the solution colorless?
    (A) 10 mL.
    (B) 15 mL.
    (C) 30 mL.
    (D) 60 mL.

30. Water molecules are best represented as :



31. Which of the following instruments can be used to observe a water molecule?
    (A) magnifying lens.
    (B) eyeglasses.
    (C) microscope
    (D) none of these.

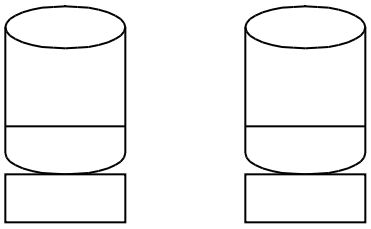
32. Which of the diagrams below, of water in sealed containers has the greatest mass?



A B C

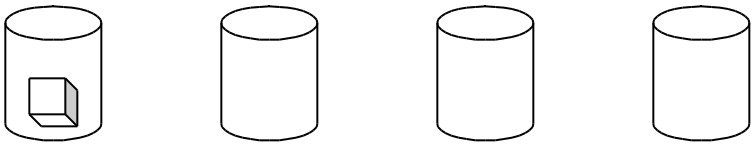
(A) A
(B) B
(C) C
(D) All of the above.

33. The diagrams to the right are of a hummingbird in a closed glass jar at different times. The jars are on a weighing scale (balance). Which of the following statements is true ?
(A) Balance B reads higher than Balance A.
(B) Balance A reads higher than Balance B.
(C) Balance B reads the same as Balance A.



A B

34. A sugar cube is dissolved in water. Then the resulting solution is boiled to dryness. Which of the following diagrams best represents what the result is?



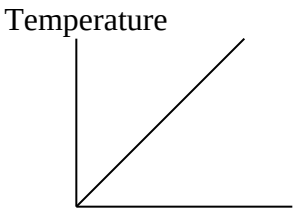
(A) (B) (C) (D)

35. Refer to Question 34 above. Which statement is true about the amount of sugar left after the solution dries?

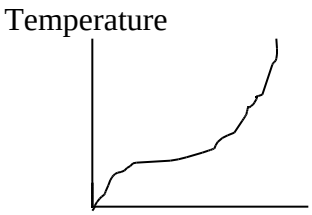
(A) It is less than the original amount in the sugar cube.
(B) It is more than the original amount in the sugar cube.
(C) It is the same as the original amount of sugar.
(D) There is no sugar left.

36. What happens to the weight of iron nails when they rust?
    (A) There is no change in the weight.
    (B) The weight increases.
    (C) The weight decreases.

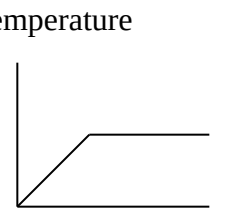
37. Cold water is heated in a pan continually. Which of the graphs below represents the temperature change of water for the time it took to boil half of it away?



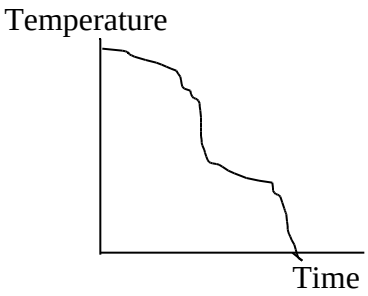
Graph A



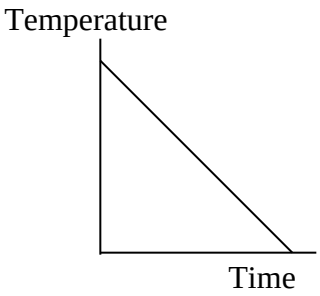
Graph B



Graph C



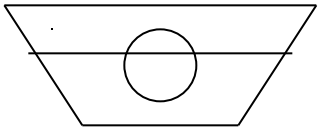
Graph D

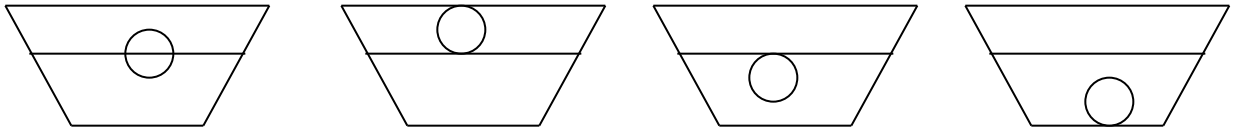


Graph E

38. The gasoline tank of a car is filled. The car is then driven until the tank is empty. The mass of the exhaust gases given off during the drive is
    (A) less than the amount of gasoline in the tank.
    (B) greater than the amount of gasoline in the tank.
    (C) exactly the same as the amount of gasoline in the tank.
    (D) impossible to tell from the information given.

39. A metallic sphere is filled with air and floats on water as shown in the diagram on the right. If all the air inside it is taken out, the diagram that shows the new location of the sphere is

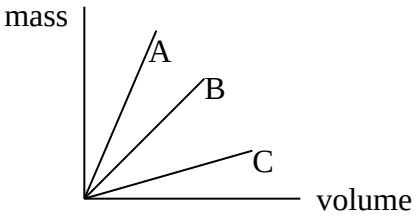




(A) (B) (C) (D)

40. A balloon filled with helium gas is released outside. As it floats upward the balloon gets bigger because
    (A) the air pressure is lower.
    (B) the air temperature is lower.
    (C) the air pressure is higher.
    (D) None of the above.

<u>*Questions 41 – 43*</u> refer to the mass vs. volume graph to the right. The graph lines represent three different substances. Graph B represents that for iron metal..



41. Which of the graph lines represents that for Aluminum?
    (A) A
    (B) B
    (C) C
    (D) None of these.

42. Which of the following graph lines represents that for Lead?
    (A) A
    (B) B
    (C) C
    (D) None of these.

43. Where would the graph line representing air be located?
    (A) Above A
    (B) Between A and B
    (C) Between B and C
    (D) Below C.

Questions 44 – 45 refer to the code as follows:

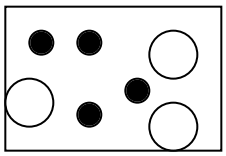
 atom of the same kind

 atom of a different kind

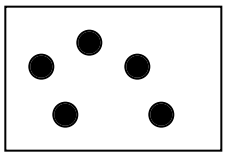
 molecule of one kind

 molecules of a different kind

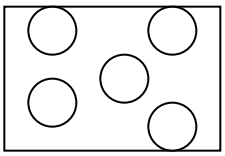
Choose from the following figures to answer # 45 and #46.



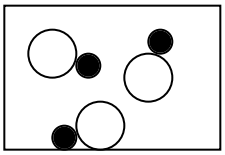
A



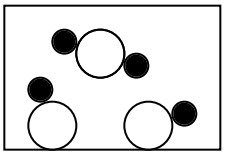
B



C



D

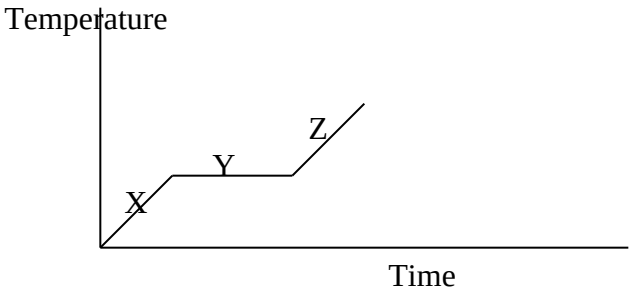


E

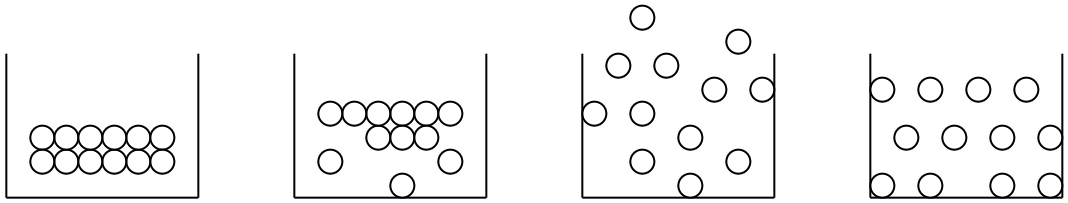
44. Which figure represents a compound?
    (A) A
    (B) B and C
    (C) D and E
    (D) D

45. Which are representations of mixtures?
    (A) A
    (B) E
    (C) D
    (D) A and E
    (E) D and E

Questions 46 – 47 refer to the graph below. It is the graph of a solid as it is heated.



46. Which of the following diagrams represents what is going on at section X?



47. Which of the diagrams in Question 46 represents what is going on at section Y?

***

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Consuelo Rogers
PHYS 540 Project
26 June 2001