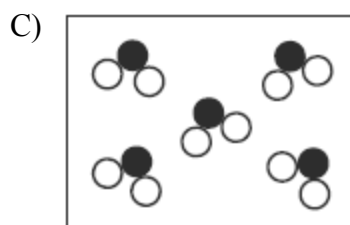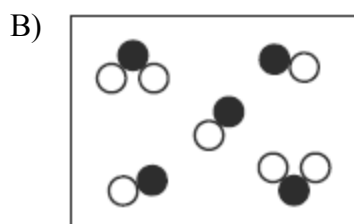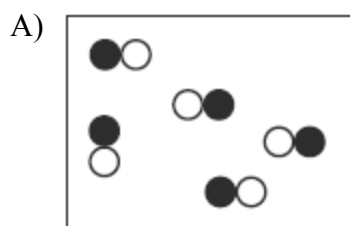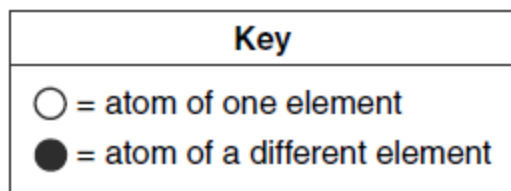1. Which particle diagram represents a sample of matter that can *not* be broken down by chemical means?
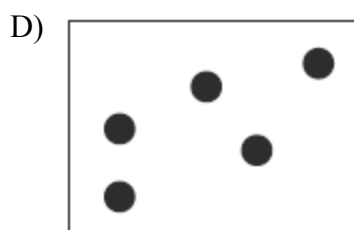
2. A substance is classified as either an element or a

   A) compound
   B) solution
   C) heterogeneous mixture
   D) homogeneous mixture

3. Which substance can *not* be broken down by a chemical change?

   A) ammonia   B) methanol
   C) propane   D) phosphorus

4. Which element is a liquid at 758 K and standard pressure?

   A) gold   B) silver
   C) platinum   D) thallium

5. Matter is classified as a

   A) substance, only
   B) substance or as a mixture of substances
   C) homogenous mixture, only
   D) homogenous mixture or as a heterogeneous mixture

6. Which list of formulas represents compounds, only?

   A) CO_2, H_2O, NH_3 B) H_2, N_2, O_2
   C) H_2, Ne, NaCl   D) MgO, NaCl, O_2

7. In the formula $X_2(SO_4)_3$, the X represents a metal. This metal could be located on the Periodic Table in

   A) Group1   B) Group 2
   C) Group 13   D) Group 14

8. Every water molecule has two hydrogen atoms bonded to one oxygen atom. This fact supports the concept that elements in a compound are

   A) chemically combined in a fixed proportion
   B) chemically combined in proportions that vary
   C) physically mixed in a fixed proportion
   D) physically mixed in proportions that vary

9. Which formula represents strontium phosphate?

   A) $SrPO_4$ B) Sr_3PO_8
   C) $Sr_2(PO_4)_3$ D) $Sr_3(PO_4)_2$

10. The compound XCl is classified as ionic if X represents the element

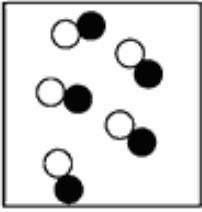   A) H   B) I   C) Rb   D) Br

11. What is the total number of different elements present in NH_4NO_3?
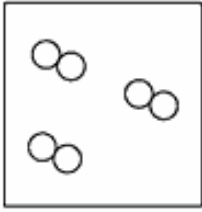
    A) 7   B) 9   C) 3   D) 4

12. Atoms of metals tend to

    A) lose electrons and form negative ions
    B) lose electrons and form positive ions
    C) gain electrons and form negative ions
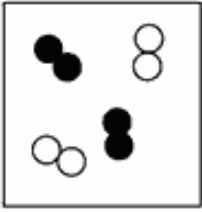   D) gain electrons and form positive ions

13. If M represents an element in Group 2, the formula of its chloride would be

A) MCl B) MCl_2
C) M_2Cl D) M_2Cl_2

14. According to the Periodic Table, which element has more than one positive oxidation state?

A) cadmium B) iron
C) silver D) zinc

15. Which is the formula for the compound that forms when magnesium bonds with phosphorus?

A) Mg_2P B) MgP_2
C) Mg_2P_3 D) Mg_3P_2

16. What is the IUPAC name for the compound ZnO?

A) zinc oxide B) zinc oxalate
C) zinc peroxide D) zinc hydroxide

17. What is the chemical formula of iron(III) sulfide?

A) FeS B) Fe_2S_3
C) $FeSO_3$ D) $Fe_2(SO_3)_3$

18. Which is a binary compound?

A) $CaCl_2$ B) KOH
C) $NaNO_3$ D) $MgSO_4$

19. What is the correct formula for ammonium carbonate?

A) $NH_4(CO_3)_2$ B) NH_4CO_3
C) $(NH_4)_2(CO_3)_2$ D) $(NH_4)_2CO_3$

20. What is the formula for sodium acetate?

A) $NaClO$ B) Na_2O
C) $Na_2C_2O_4$ D) $NaC_2H_3O_2$

21. Which formula represents the compound aluminum iodide?

A) AlI B) AlI_3 C) Al_3I D) Al_3I_3

22. Powdered sulfur is yellow, and powdered iron is gray. When powdered sulfur and powdered iron are mixed at 20°C, the powdered iron

A) becomes yellow B) becomes a liquid
C) remains ionic D) remains magnetic

23. Which formula represents a mixture?

A) $C_6H_{12}O_6(\ell)$ B) $C_6H_{12}O_6(s)$
C) $LiCl(aq)$ D) $LiCl(s)$

24. Bronze contains 90 to 95 percent copper and 5 to 10 percent tin. Because these percentages can vary, bronze is classified as

A) a compound B) an element
C) a mixture D) a substance

25. A mixture of crystals of salt and sugar is added to water and stirred until all solids have dissolved. Which statement best describes the resulting mixture?

A) The mixture is homogeneous and can be separated by filtration.
B) The mixture is homogeneous and cannot be separated by filtration.
C) The mixture is heterogeneous and can be separated by filtration.
D) The mixture is heterogeneous and cannot be separated by filtration.

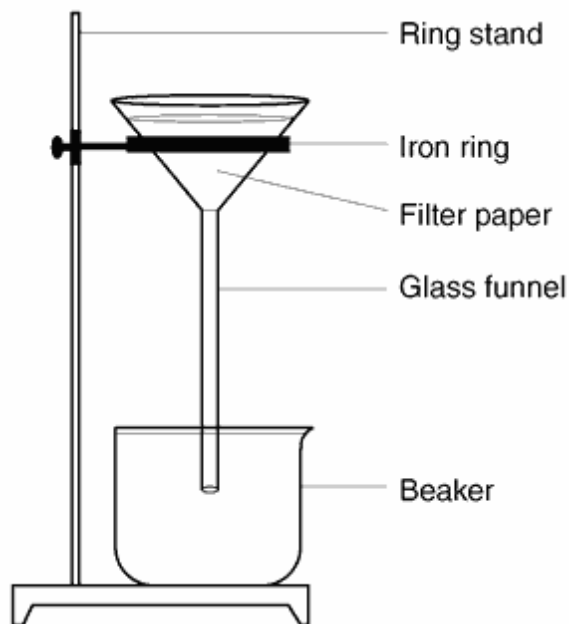26. Given the diagrams X, Y, and Z below:

Which diagram or diagrams represent a mixture of elements A and B?

A) X, only B) Z, only
C) X and Y D) X and Z

27. At room temperature, a mixture of sand and water can be separated by

A) ionization B) combustion
C) filtration D) sublimation

28. Which mixture can be separated by using the equipment shown below?

Ring stand

Iron ring

Filter paper

Glass funnel

Beaker

A) NaCl(aq) and SiO₂(s)
B) NaCl(aq) and C₆H₁₂O₆(aq)
C) CO₂(aq) and NaCl(aq)
D) CO₂(aq) and C₆H₁₂O₆(aq)

A) $NaCl(aq)$ and $SiO_2(s)$
B) $NaCl(aq)$ and $C_6H_{12}O_6(aq)$
C) $CO_2(aq)$ and $NaCl(aq)$
D) $CO_2(aq)$ and $C_6H_{12}O_6(aq)$

29. Which compound mixed with sand could be separated from the sand by following the three steps below?

Step 1–Add water to the mixture of the compound and sand.

Step 2–Filter the mixture of the compound and sand.

Step 3–Collect the filtrate containing the soluble component and evaporate the water.

A) $BaCO_3$ B) Na_2CO_3
C) $HgCl$ D) $AgCl$

30. Which sample of matter can be separated into different substances by physical means?

A) $LiCl(aq)$ B) $LiCl(s)$
C) $NH_3(g)$ D) $NH_3(\ell)$

31. Petroleum can be separated by distillation because the hydrocarbons in petroleum are

A) elements with identical boiling points
B) elements with different boiling points
C) compounds with identical boiling points
D) compounds with different boiling point

32. A bottle of rubbing alcohol contains both 2-propanol and water. These liquids can be separated by the process of distillation because the 2-propanol and water

A) have combined chemically and retain their different boiling points
B) have combined chemically and have the same boiling point
C) have combined physically and retain their different boiling points
D) have combined physically and have the same boiling point