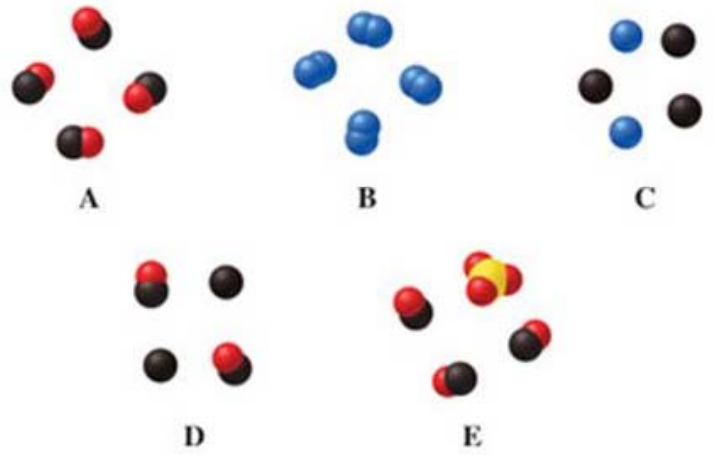
1. Which of the following does **not** apply to a chemical compound?
   A. A chemical compound consists of two or more elements.
   B. The elements in a compound are combined in definite proportions.
   C. The characteristics of the compound are different from the characteristics of the elements from which it is made.
   D. Compounds can be separated into their constituent elements using only physical methods.
   E. A chemical compound can also be classified as a pure substance.

2. A combination of two or more substances that can be separated by using only a physical process is:
   A. an element.
   B. a substance.
   C. a composition.
   D. a compound.
   E. a mixture.

3. Which image(s) in the figure represents a mixture of two elements?



   A. image D
   B. images C and D
   C. image B
   D. image A
   E. image C

4. The symbol for the element potassium is_____.
   A. Po
   B. Pa
   C. Pt
   D. P
   E. K

5. The physical state of matter which does not have a characteristic shape, but takes on the shape of the filled part of its container, is:
   A. liquid.
   B. gas.
   C. solid.
   D. liquid or gas.
   E. solid or liquid.

6. The proprietor of a rock shop insists that a nugget is pure gold. If the nugget occupies a volume of 5.40 mL, what would its mass have to be if it were truly pure gold? (d_{gold} = 19.3 g/mL)
   A. 104 g
   B. 13.9 g
   C. insufficient information given
   D. 3.57 g
   E. 0.279 g

7. Which of the following is **not** an example of a physical property?
   A. Helium is a gas at room temperature.
   B. Sand is more dense than water.
   C. Water is colorless.
   D. The boiling point of acetone is 56°C.
   E. Copper gets a greenish coating on it when exposed to moist air.

8. A 43 g serving of a chocolate candy has 2.10×10^2 Calories. Convert this energy to units of joules.
   A. 5.02×10^4 J
   B. 8.79×10^3 J
   C. 50.2 J
   D. 8.79×10^5 J
   E. 879 J

9. Which of the following is **not** part of Dalton's atomic theory?
   A. Atoms combine in whole-number ratios to form chemical compounds.
   B. Chemical reactions involve a rearrangement of the atoms in the starting materials.
   C. All atoms of a given element have identical mass and chemical properties.
   D. All matter is composed of small indivisible particles called atoms.
   E. Atoms of one element can be changed to atoms of another element in a chemical reaction.

10. The subatomic particles studied by chemists that make up the atom include all of the following except the:
    A. alpha particle and neutron.
    B. neutron.
    C. alpha particle.
    D. electron.
    E. proton.

11. Which of the following statements regarding the nucleus of the atom is **incorrect**?
A. The nucleus contains most of the mass of the atom.
B. The nucleus contains the electrons and the protons.
C. The nucleus contains the protons **and** most of the mass of the atom.
D. The nucleus is the central core of the atom.
E. The nucleus contains the neutrons.

12. The number of protons and neutrons in an atom of magnesium-25 is:
A. 25 protons and 12 neutrons.
B. 12 protons and 25 neutrons.
C. 12 protons and 13 neutrons.
D. 25 protons and 37 neutrons.
E. 13 protons and 12 neutrons.

13. The isotope symbol for an ion that has 11 protons, 12 neutrons, and 10 electrons is:
A. $^{12}_{11}Na^{+}$
B. $^{23}_{11}Na$
C. $^{23}_{12}Mg^{2+}$
D. $^{12}_{11}Na$
E. $^{23}_{11}Na^{+}$

14. On the planet Invertios, boron has two isotopes as follows:

Isotope	Mass (amu)	Natural Abundance (%)
Boron-10	10.0129	80.00
Boron-11	11.0093	20.00

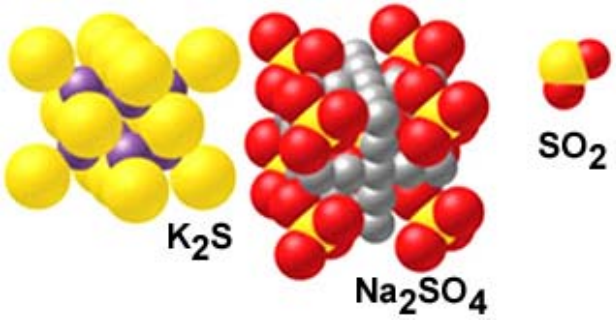
Estimate the relative atomic mass of boron on Invertios.
A. 10.8 amu
B. 11.0 amu
C. 10.2 amu
D. 10.5 amu
E. 10.0 amu

15. Which of the following statements about the modern periodic table is **incorrect**?
A. The elements are arranged in rows and columns to emphasize periodic properties.
B. Each group has a Roman numeral and a letter associated with it.
C. The periodic table is arranged by increasing atomic mass.
D. A horizontal row of elements is called a period.
E. Elements in the same vertical column are called groups or families.

16. Which set of elements below contains, respectively, an alkali metal, a halogen, and a transition metal?
A. Sc, Ba, I
B. Li, S, Fe
C. H, F, V
D. Rb, Br, Ag
E. Ca, Kr, Mn

17. Which of the following elements does **not** occur as a diatomic molecule?
A. carbon
B. fluorine
C. iodine
D. hydrogen
E. nitrogen

18. Which of the substance(s) shown in the figure is ionic?



A. Na_2SO_4
B. K_2S
C. SO_2
D. Both K_2S and Na_2SO_4
E. Both Na_2SO_4 and SO_2

19. Rank the boiling points of the following compounds from lowest to highest: CO_2, LiF, H_2O
A. $H_2O < CO_2 < LiF$
B. $LiF < CO_2 < H_2O$
C. $CO_2 < LiF < H_2O$
D. $CO_2 < H_2O < LiF$
E. $H_2O < LiF < CO_2$

20. Which combination of formula and name is **incorrect**?
A. O^{2-} = oxide ion
B. F^- = fluoride ion
C. Na^+ = sodium ion
D. N^{2-} = nitride ion
E. Ca^{2+} = calcium ion

21. Which of the following combinations of formula and name is **incorrect**?
A. nitrate ion = NO_3^-
B. sulfide ion = SO_3^{2-}
C. hydroxide ion = OH^-
D. nitrite ion = NO_2^-
E. sulfate ion = SO_4^{2-}

22. Based on common charges, which formula for an ionic compound is **incorrect**?
A. K_3P
B. CaCl
C. MgS
D. NaF
E. SrO

23. Which of the following formula/name pairs is **incorrect**?
A. $BaBr_2$ barium bromide
B. CuO copper(II) oxide
C. $MgCl_2$ magnesium dichloride
D. $LiNO_3$ lithium nitrate
E. $Sr(OH)_2$ strontium hydroxide

24. Which of the following formula/name combinations is **incorrect**?
A. SO_3 sulfur trioxide
B. PCl_3 phosphorus trichloride
C. CS_2 carbon disulfide
D. ClO_2 dichlorine oxide
E. N_2O_4 dinitrogen tetroxide

25. The correct formula for tetraphosphorus hexasulfide is:
A. PS
B. P_5S_6
C. P_4S_6
D. P_5S_7
E. P_4S_7

Key

1. D
2. E
3. E
4. E
5. A
6. A
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9. E
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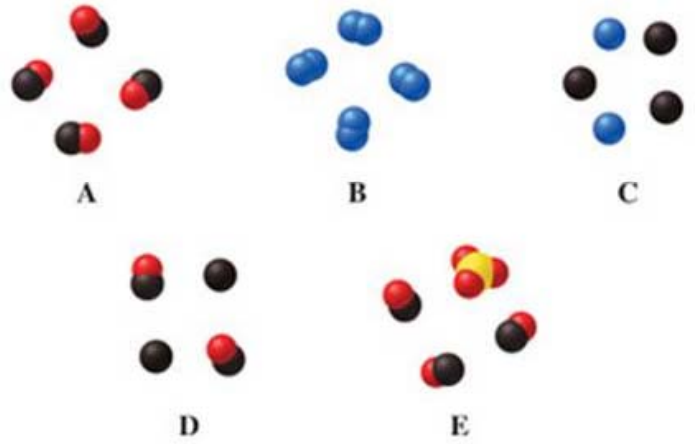

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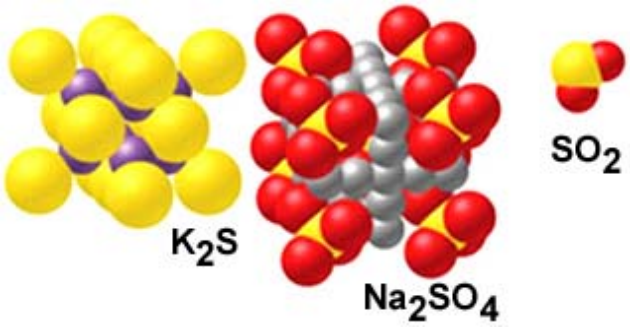

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11. B
12. D
13. B
14. B
15. E
16. D
17. E
18. B
19. D
20. C
21. C
22. B
23. A
24. D
25. E