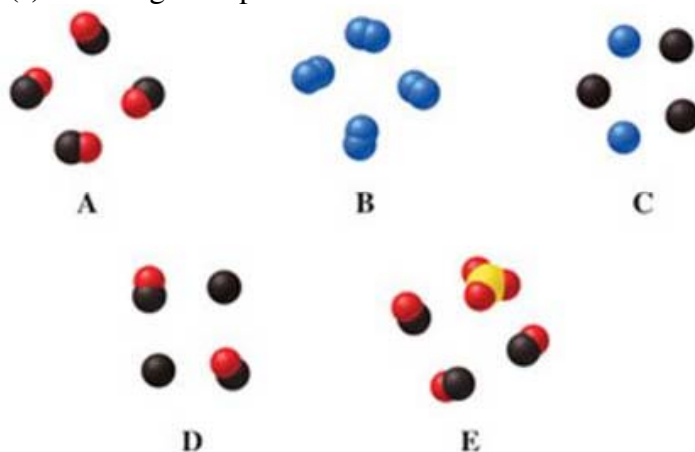


1. Which of the following does **not** apply to a chemical compound?
 - A. A chemical compound consists of two or more elements.
 - B. The elements in a compound are combined in definite proportions.
 - C. The characteristics of the compound are different from the characteristics of the elements from 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?

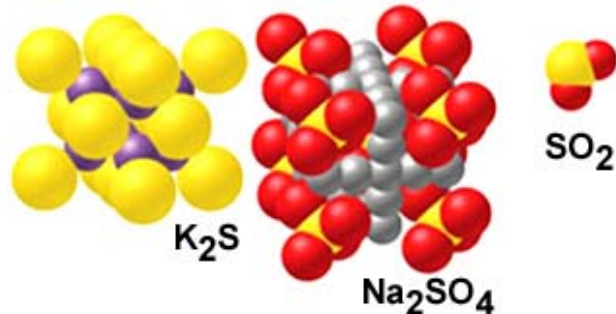


- A. image D
 - B. images C and D
 - C. image B
 - D. image A
 - E. image C
4. The symbol for the element potassium is_____.
 - A. Po
 - B. Pa
 - C. Pt
 - D. P
 - E. K

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:
- liquid.
 - gas.
 - solid.
 - liquid or gas.
 - 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? ($d_{\text{gold}} = 19.3 \text{ g/mL}$)
- 104 g
 - 13.9 g
 - insufficient information given
 - 3.57 g
 - 0.279 g
7. Which of the following is **not** an example of a physical property?
- Helium is a gas at room temperature.
 - Sand is more dense than water.
 - Water is colorless.
 - The boiling point of acetone is 56°C .
 - 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.
- $5.02 \times 10^4 \text{ J}$
 - $8.79 \times 10^3 \text{ J}$
 - 50.2 J
 - $8.79 \times 10^5 \text{ J}$
 - 879 J
9. Which of the following is **not** part of Dalton's atomic theory?
- Atoms combine in whole-number ratios to form chemical compounds.
 - Chemical reactions involve a rearrangement of the atoms in the starting materials.
 - All atoms of a given element have identical mass and chemical properties.
 - All matter is composed of small indivisible particles called atoms.
 - 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:
- alpha particle and neutron.
 - neutron.
 - alpha particle.
 - electron.
 - 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. ${}_{11}^{12}\text{Na}^+$
 - B. ${}_{11}^{23}\text{Na}$
 - C. ${}_{12}^{23}\text{Mg}^{2+}$
 - D. ${}_{11}^{12}\text{Na}$
 - E. ${}_{11}^{23}\text{Na}^+$
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

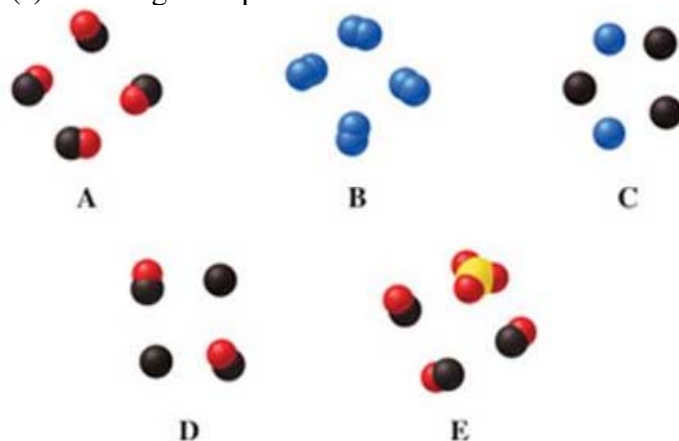
21. Which of the following combinations of formula and name is **incorrect**?
- A. nitrate ion = NO_3^-
 - B. sulfide ion = SO_3^{2-}
 - C. hydroxide ion = OH^-
 - D. nitrite ion = NO_2^-
 - E. sulfate ion = SO_4^{2-}
22. Based on common charges, which formula for an ionic compound is **incorrect**?
- 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. $\text{Sr}(\text{OH})_2$ 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
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Key

1. D
2. E
3. E
4. E
5. A
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10. C
11. B
12. C
13. E
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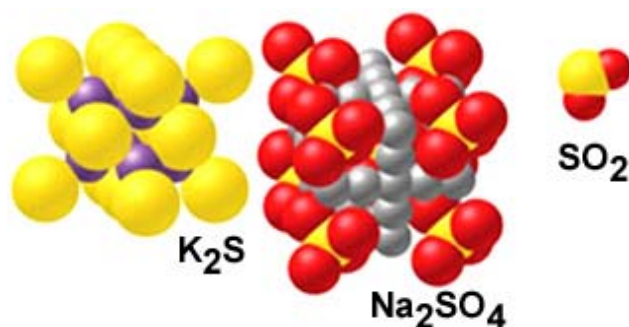


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Key

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4. C
5. B
6. E
7. E
8. C
9. A
10. E
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