

## 1

Student: \_\_\_\_\_

1. Of five major gaseous components of air, which is the only one to vary significantly in concentration from place to place and from day to day?
  - A. water vapor
  - B. carbon dioxide
  - C. nitrogen
  - D. argon
  
2. Which two gases make up more than 95% of an inhaled breath?
  - A.  $\text{NO}_2$  and  $\text{N}_2$
  - B.  $\text{CO}_2$  and  $\text{O}_2$
  - C.  $\text{O}_2$  and  $\text{N}_2$
  - D.  $\text{N}_2$  and Ar
  
3. What is the primary component of an exhaled breath?
  - A.  $\text{N}_2$
  - B.  $\text{O}_2$
  - C.  $\text{CO}_2$
  - D.  $\text{H}_2\text{O}$
  
4. Which component of the air makes up approximately 100 times more of an exhaled breath than of an inhaled breath?
  - A. Ar
  - B.  $\text{O}_2$
  - C.  $\text{O}_3$
  - D.  $\text{CO}_2$
  
5. The \_\_\_\_\_ concentration in the air over the desert differs dramatically from that in the air in the tropical rainforest.
  - A.  $\text{N}_2$
  - B.  $\text{O}_2$
  - C.  $\text{CO}_2$
  - D.  $\text{H}_2\text{O}$
  
6. Which component of the air is an element?
  - A.  $\text{H}_2\text{O}$
  - B.  $\text{NO}_2$
  - C.  $\text{O}_2$
  - D.  $\text{CO}_2$
  
7. Air is a(n)
  - A. element.
  - B. compound.
  - C. mixture.

D. pure substance.

8. Which substance is *not* considered to be an air pollutant?

A. N<sub>2</sub>

B. SO<sub>2</sub>

C. NO<sub>2</sub>

D. O<sub>3</sub>

9. Ozone is considered an air pollutant in the \_\_\_\_\_ but is a valuable protective layer in the \_\_\_\_\_.

A. troposphere; stratosphere

B. stratosphere; mesosphere

C. stratosphere; troposphere

D. mesosphere; stratosphere

10. A particular sample of air is 2.5% water vapor. Express the concentration of water vapor in parts per million (ppm).

A. 0.0000025 ppm

B. 0.025 ppm

C. 250 ppm

D. 25000 ppm

11. The EPA limit for CO is 9 ppm. Express this number as a percentage.

A. 90%

B. 9%

C. 0.09%

D. 0.0009%

12. The quantity 0.0000064 g expressed in scientific notation is:

A.  $6.4 \times 10^6$  g

B.  $6.4 \times 10^{-6}$  g

C.  $6.4 \times 10^7$  g

D.  $6.4 \times 10^{-7}$  g

13. The quantity  $8.7 \times 10^5$  g expressed in standard decimal notation is:

A. 0.000087 g

B. 870.000 g

C. 0.0000087 g

D. 870,000 g

14. Which pollutant is present in air as particulate matter?

A. soot

B. ozone

C. sulfur dioxide

D. carbon monoxide

15. What two factors are considered when determining the risk assessment for air pollutants?

- A. exposure and ppm
- B. percentage and ppm
- C. toxicity and percentage
- D. toxicity and exposure

16. When assessing the risk of an air pollutant, which does not play a role in considering someone's exposure to the pollutant?

- A. a person's lung capacity
- B. a person's breathing rate
- C. the toxicity of the pollutant
- D. the concentration in air of the pollutant

17. The burning of coal produces sulfur dioxide,  $\text{SO}_2$ , a pollutant that slowly reacts in air to form  $\text{SO}_3$ . Sulfur trioxide dissolves into airborne water droplets to form a very corrosive solution of sulfuric acid. Which is a product of burning coal that hastens the transformation of sulfur dioxide into sulfur trioxide?

- A. carbon dioxide
- B. carbon monoxide
- C. nitrogen dioxide
- D. particles of ash

18. All of these pollutants can be detected by their odors except:

- A.  $\text{CO}$
- B.  $\text{O}_3$
- C.  $\text{SO}_x$
- D.  $\text{NO}_x$

19. Which pollutant are you more likely to encounter in dangerous concentrations indoors rather than outdoors?

- A. nitrogen dioxide
- B. carbon monoxide
- C. ozone
- D. sulfur dioxide

20. In general, which airborne material is not likely to be affected by the filters or indoor air handling equipment?

- A. particulates
- B. pollen
- C. soot
- D. carbon monoxide

21. Which color, as used in the Air Quality Index, warns that the level of a pollutant is hazardous, the most dangerous level?

- A. orange
- B. green
- C. yellow
- D. maroon

22. A substance that can be broken down into two or more simpler substances by chemical methods is called a(n)

- A. compound.
- B. mixture.

C. element.

D. isotope.

23. On a Periodic Table, the columns of elements with similar properties are

A. periods.

B. groups.

C. rows.

D. metals.

24. The most numerous of the elements are the

A. metals.

B. non metals.

C. metalloids.

D. noble gases.

25. Which is *not* a mixture?

A. a jar filled with rocks and sand

B. sea water

C. a glass of Kool-Aid

D. sodium chloride

26. Which is *not* a pure substance?

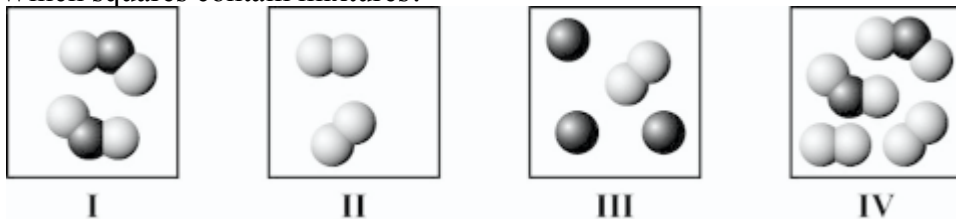
A. helium

B. copper wire

C. air

D. sucrose

27. Which squares contain mixtures?



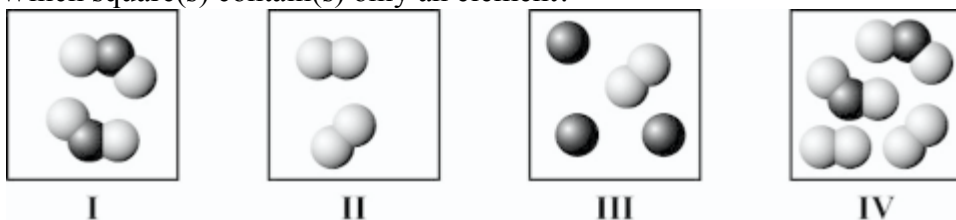
A. II and III only

B. III and IV only

C. I, III, and IV only

D. I and IV only

28. Which square(s) contain(s) only an element?



A. I only

B. II only

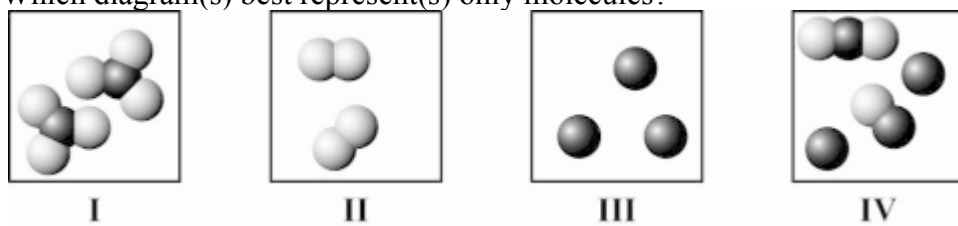
C. I and II only

D. III and IV only



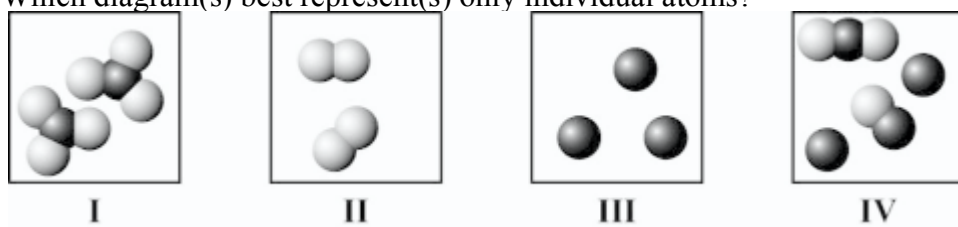
- A. I only
- B. II only
- C. I and II only
- D. II and IV only

35. Which diagram(s) best represent(s) only molecules?



- A. I only
- B. II only
- C. III only
- D. I and II only
- E. IV only

36. Which diagram(s) best represent(s) only individual atoms?



- A. I only
- B. II only
- C. III only
- D. IV only
- E. II and III only

37. Except in the case of hydrocarbons, when naming virtually all compounds made up of two elements, the second element mentioned

- A. ends in "ide."
- B. is preceded by "mono" (or occasionally "mon").
- C. is always the more metallic element.
- D. is the one present in the greater number of atoms.

38. Based on its name, which carbon compound contains the fewest carbon atoms?

- A. ethanol
- B. methane
- C. chlorobutane
- D. propyl alcohol

39.  $\text{P}_2\text{O}_5$  is the chemical formula for

- A. pentoxygen diphosphide.
- B. diphosphorus pentoxide.
- C. dioxygen pentaphosphide.
- D. monophosphorus pentoxide.

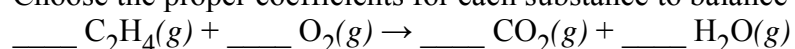
40. The name of the compound formed by combining carbon atoms with oxygen atoms to form is

- A. carbon oxide.
- B. monocarbon dioxide.
- C. carbon dioxide.
- D. carbonate.

41. During a chemical reaction,

- A. atoms are rearranged.
- B. some atoms are destroyed and new ones are formed.
- C. some elements are destroyed and new ones are formed.
- D. the law of conservation of matter and mass may be briefly violated.

42. Choose the proper coefficients for each substance to balance this equation.



- A. 1, 1, 2, 2
- B. 1, 3, 2, 2
- C. 2, 3, 4, 2
- D. 2, 2, 4, 2

43. Choose the proper coefficients for each substance to yield a balanced equation.





- A. 1, 1, 1
- B. 2, 1, 1
- C. 2, 1, 2
- D. 2, 1, 1




44. Which is the balanced chemical equation showing hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) decomposing into hydrogen ( $\text{H}_2$ ) and oxygen ( $\text{O}_2$ )?

- A.  $\text{H}_2\text{O}_2 \rightarrow \text{H}_2 + \text{O}_2$
- B.  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}_2$
- C.  $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}_2$
- D.  $2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2 + \text{O}_2$

45. Which is the balanced chemical equation for the reaction of nitrogen ( $\text{N}_2$ ) with oxygen ( $\text{O}_2$ ) to form NO?

- A.  $2 \text{NO} \rightarrow \text{N}_2 + \text{O}_2$
- B.  $\text{N}_2 + \text{O}_2 \rightarrow \text{NO}$
- C.  $\text{N}_2 + \text{O}_2 \rightarrow 2 \text{NO}$
- D.  $\text{NO} \rightarrow \text{N}_2 + \text{O}_2$

46. Which shows the balanced equation for the reaction of nitrogen (  ), as it is normally found in our atmosphere, with oxygen (  ), as it is normally found in our atmosphere, to form nitrogen dioxide?

- A. 
- B. 
- C. 
- D.



47. The two main products of the combustion of gasoline in an automobile engine are
- oxygen and carbon monoxide.
  - sulfur oxides and nitrogen oxides.
  - sulfur oxides and hydrogen.
  - water and carbon dioxide.
48. Green chemistry is
- the study of how to improve the production of oxygen via photosynthesis.
  - any chemistry having an agricultural base.
  - the cause of the higher temperatures and humidity typically found in greenhouses.
  - the design of products and processes that reduce hazardous substances.
49. Catalytic converters reduce the amount of \_\_\_\_\_ in car exhaust.
- $O_3$
  - $CO_2$
  - CO
  - $N_2$
50. Ozone is a secondary pollutant. A secondary pollutant is
- not as hazardous as a primary pollutant.
  - not produced directly but as the product of the interaction of two or more pollutants.
  - one that is naturally present in our atmosphere.
  - one that is less hazardous than a primary pollutant.
51. There are approximately  $2 \times 10^{22}$  molecules and atoms in each breath we take and the concentration of CO in the air is approximately 9 parts per million. Approximately how many CO molecules are in each breath we take?
- $2 \times 10^{15}$
  - $1.8 \times 10^{17}$
  - $2 \times 10^{17}$
  - $2 \times 10^{29}$
52. Which of the following would be described as "fine particles"?
- SO<sub>x</sub>
  - NO<sub>x</sub>
  - O<sub>3</sub>
  - 2.5  $\mu$ m diameter soot
53. Which if the following is the chemical symbol for silver?
- Au
  - Pb
  - Ag
  - Fe



54. Which of the following is a pure substance?

- A. Lemonade
- B. Concrete
- C. Gasoline
- D. Silver wire

55. The lowest (or closest to the ground) layer of our atmosphere is the

- A. troposphere.
- B. ozone layer.
- C. stratosphere.
- D. mesosphere.

56. Which is the following *incorrectly* represents a combustion reaction?

- A.  $2 \text{CH}_4 + 3 \text{O}_2 \rightarrow 2 \text{CO}_2 + 2 \text{H}_2\text{O}$
- B.  $\text{S}_8 + 8 \text{O}_2 \rightarrow 8 \text{SO}_2$
- C.  $\text{N}_2 + 2 \text{O}_2 \rightarrow 2 \text{NO}_2$
- D.  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow 3 \text{CO}_2$

57. Balance this equation  $\text{P}_4 + \text{Cl}_2 \rightarrow \text{PCl}_5$  with the smallest whole number coefficients. Choose the answer that is the sum of the coefficients. Do not forget coefficients of "one".

- A. 7
- B. 9
- C. 11
- D. 13
- E. 15

58. Which of the following are examples of technological advances that have reduced air pollution?

- ☐ Paint with reduced VOCs
- ☐ Catalytic converters
- ☐ Burning gasoline in leaf blowers
- ☐ Low sulfur Diesel fuels

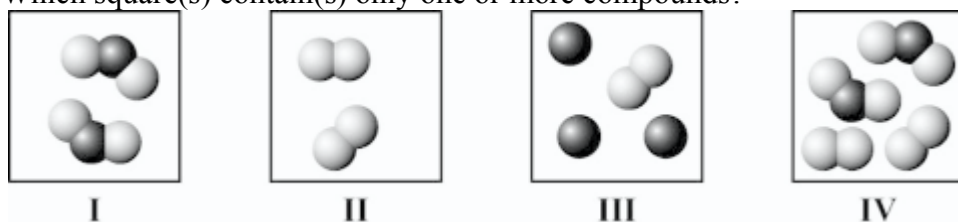
59. If 500 mL of air contains  $2 \times 10^{22}$  particles (atoms and molecules), how many particles do you inhale in one day if you breathe 15000 L of air?

- A.  $2 \times 10^{22}$
- B.  $6 \times 10^{26}$
- C.  $1.2 \times 10^{27}$
- D.  $5 \times 10^{24}$

60. If we assume that the top of Mt. Everest is the highest land mass on earth, hikers who scale its summit are standing in the

- A. mesosphere.
- B. stratosphere.
- C. troposphere.
- D. ozone layer.

61. Which square(s) contain(s) only one or more compounds?



- A. I only
- B. II only
- C. I and IV only
- D. II and III only

62. The chemical formula for nitrogen monoxide is:

- A.  $\text{N}_2\text{O}$
- B. NO
- C.  $\text{NO}_2$
- D.  $\text{N}_2\text{O}_3$

63. Which correctly pairs an indoor pollutant with its source?

- A. formaldehyde and unvented space heaters
- B.  $\text{O}_3$  and electrical arcing
- C. radon and glues and solvents
- D. nicotine and paint and paint thinners

1 KEY

1. Of five major gaseous components of air, which is the only one to vary significantly in concentration from place to place and from day to day?
- A. water vapor
- B. carbon dioxide
- C. nitrogen
- D. argon

Think about differences in humidity.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.02  
Testbank - Testbank Chapter... #1  
Topic: Study of Chemistry

2. Which two gases make up more than 95% of an inhaled breath?
- A. NO<sub>2</sub> and N<sub>2</sub>
- B. CO<sub>2</sub> and O<sub>2</sub>
- C. O<sub>2</sub> and N<sub>2</sub>
- D. N<sub>2</sub> and Ar

Think about the two main components of the atmosphere.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.02  
Testbank - Testbank Chapter... #2  
Topic: Study of Chemistry

3. What is the primary component of an exhaled breath?
- A. N<sub>2</sub>
- B. O<sub>2</sub>
- C. CO<sub>2</sub>
- D. H<sub>2</sub>O

The main component of an exhaled breath is the same as the main component of an inhaled breath.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.02  
Testbank - Testbank Chapter... #3  
Topic: Study of Chemistry

4. Which component of the air makes up approximately 100 times more of an exhaled breath than of an inhaled breath?
- A. Ar
- B. O<sub>2</sub>
- C. O<sub>3</sub>
- D. CO<sub>2</sub>

American - Chapter 01  
Blooms Level: 2. Understand  
Section: 01.02  
Testbank - Testbank Chapter... #4  
Topic: Study of Chemistry

5. The \_\_\_\_\_ concentration in the air over the desert differs dramatically from that in the air in the tropical rainforest.
- A. N<sub>2</sub>
- B. O<sub>2</sub>
- C. CO<sub>2</sub>
- D. H<sub>2</sub>O

Think about the dry air in the desert.

Blooms Level: 2. Understand  
 Section: 01.02  
 Testbank - Testbank Chapter... #5  
 Topic: Study of Chemistry

6. Which component of the air is an element?

- A. H<sub>2</sub>O
- B. NO<sub>2</sub>
- C. O<sub>2</sub>**
- D. CO<sub>2</sub>

Only one of these contains all the same type of atom.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.06  
 Subtopic: Elements  
 Subtopic: Molecules  
 Testbank - Testbank Chapter... #6  
 Topic: Components of Matter  
 Topic: Study of Chemistry

7. Air is a(n)

- A. element.
- B. compound.
- C. mixture.**
- D. pure substance.

There are several substances in air.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.06  
 Subtopic: Classification of Matter  
 Testbank - Testbank Chapter... #7  
 Topic: Components of Matter

8. Which substance is *not* considered to be an air pollutant?

- A. N<sub>2</sub>**
- B. SO<sub>2</sub>
- C. NO<sub>2</sub>
- D. O<sub>3</sub>

One if these is the primary component of uncontaminated air while the rest are pollutants.

American - Chapter 01  
 Blooms Level: 1. Remember  
 Section: 01.03  
 Subtopic: Classification of Matter  
 Testbank - Testbank Chapter... #8  
 Topic: Components of Matter  
 Topic: Study of Chemistry

9. Ozone is considered an air pollutant in the \_\_\_\_\_ but is a valuable protective layer in the \_\_\_\_\_.

- A. troposphere; stratosphere**
- B. stratosphere; mesosphere
- C. stratosphere; troposphere
- D. mesosphere; stratosphere

Remember that we live in the troposphere.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.02  
 Testbank - Testbank Chapter... #9  
 Topic: Environmental Chemistry

10. A particular sample of air is 2.5% water vapor. Express the concentration of water vapor in parts per million (ppm).

- A. 0.0000025 ppm
- B. 0.025 ppm

C. 250 ppm

**D.** 25000 ppm

Percent is parts per hundred. One hundred is 10,000 times less than one million.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.02  
Subtopic: Measurements  
Testbank - Testbank Chapter... #10  
Topic: Study of Chemistry

11. The EPA limit for CO is 9 ppm. Express this number as a percentage.

A. 90%

B. 9%

C. 0.09%

**D.** 0.0009%

Percent is parts per hundred. One hundred is 10,000 times less than one million.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.02  
Subtopic: Measurements  
Testbank - Testbank Chapter... #11  
Topic: Study of Chemistry

12. The quantity 0.0000064 g expressed in scientific notation is:

A.  $6.4 \times 10^6$  g

**B.**  $6.4 \times 10^{-6}$  g

C.  $6.4 \times 10^7$  g

D.  $6.4 \times 10^{-7}$  g

Negative powers of ten move the decimal to the left.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.03  
Subtopic: Scientific Notation  
Testbank - Testbank Chapter... #12  
Topic: Study of Chemistry

13. The quantity  $8.7 \times 10^5$  g expressed in standard decimal notation is:

A. 0.000087 g

B. 870.000 g

C. 0.0000087 g

**D.** 870,000 g

Positive powers of ten move the decimal to the right.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.03  
Subtopic: Measurements  
Subtopic: Scientific Notation  
Testbank - Testbank Chapter... #13  
Topic: Study of Chemistry

14. Which pollutant is present in air as particulate matter?

**A.** soot

B. ozone

C. sulfur dioxide

D. carbon monoxide

Particulate matter is solid not gaseous.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.02  
Subtopic: Fundamental Definitions

15. What two factors are considered when determining the risk assessment for air pollutants?

- A. exposure and ppm
- B. percentage and ppm
- C. toxicity and percentage
- D. toxicity and exposure**

Remember that some things are poisonous in a short time frame and others are toxic after long time frames.

16. When assessing the risk of an air pollutant, which does not play a role in considering someone's exposure to the pollutant?

- A. a person's lung capacity
- B. a person's breathing rate
- C. the toxicity of the pollutant**
- D. the concentration in air of the pollutant

17. The burning of coal produces sulfur dioxide,  $\text{SO}_2$ , a pollutant that slowly reacts in air to form  $\text{SO}_3$ . Sulfur trioxide dissolves into airborne water droplets to form a very corrosive solution of sulfuric acid. Which is a product of burning coal that hastens the transformation of sulfur dioxide into sulfur trioxide?

- A. carbon dioxide
- B. carbon monoxide
- C. nitrogen dioxide
- D. particles of ash**

This transformation takes place on solid particles.

18. All of these pollutants can be detected by their odors except:

- A. CO**
- B.  $\text{O}_3$
- C.  $\text{SO}_x$
- D.  $\text{NO}_x$

Remember that you might need a detector for this substance in your home for protection.

19. Which pollutant are you more likely to encounter in dangerous concentrations indoors rather than outdoors?

- A. nitrogen dioxide
- B. carbon monoxide**
- C. ozone
- D. sulfur dioxide

This comes from the incomplete combustion of hydrocarbon fuels.

Subtopic: States of Matter  
Testbank - Testbank Chapter... #19  
Topic: Environmental Chemistry

20. In general, which airborne material is not likely to be affected by the filters or indoor air handling equipment?

- A. particulates
- B. pollen
- C. soot
- D. carbon monoxide**

Filters cannot trap gases.

American - Chapter 01  
Blooms Level: 2. Understand  
Section: 01.02  
Subtopic: States of Matter  
Testbank - Testbank Chapter... #20  
Topic: Environmental Chemistry

21. Which color, as used in the Air Quality Index, warns that the level of a pollutant is hazardous, the most dangerous level?

- A. orange
- B. green
- C. yellow
- D. maroon**

This is similar to other color-coded warning systems.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.04  
Testbank - Testbank Chapter... #21  
Topic: Environmental Chemistry

22. A substance that can be broken down into two or more simpler substances by chemical methods is called a(n)

- A. compound.**
- B. mixture.
- C. element.
- D. isotope.

Mixtures are separable by physical means.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.06  
Subtopic: Classification of Matter  
Subtopic: Fundamental Definitions  
Testbank - Testbank Chapter... #22  
Topic: Components of Matter  
Topic: Study of Chemistry

23. On a Periodic Table, the columns of elements with similar properties are

- A. periods.
- B. groups.**
- C. rows.
- D. metals.

Periods and rows go across.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.06  
Subtopic: Periodic Table  
Testbank - Testbank Chapter... #23  
Topic: Components of Matter  
Topic: Study of Chemistry

24. The most numerous of the elements are the

- A. metals.**
- B. non metals.
- C. metalloids.

D. noble gases.

These are green in the periodic table in your textbook.

American - Chapter 01  
 Blooms Level: 1. Remember  
 Subtopic: Periodic Table  
 Testbank - Testbank Chapter... #24  
 Topic: Components of Matter

25. Which is *not* a mixture?

- A. a jar filled with rocks and sand
- B. sea water
- C. a glass of Kool-Aid
- D. sodium chloride**

Mixtures include more than one pure substance.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.06  
 Subtopic: Fundamental Definitions  
 Subtopic: Properties of Matter  
 Testbank - Testbank Chapter... #25  
 Topic: Components of Matter

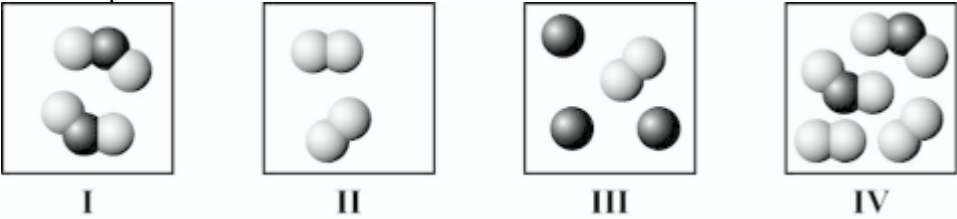
26. Which is *not* a pure substance?

- A. helium
- B. copper wire
- C. air**
- D. sucrose

Mixtures are not pure substances.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.06  
 Subtopic: Properties of Matter  
 Testbank - Testbank Chapter... #26  
 Topic: Components of Matter

27. Which squares contain mixtures?

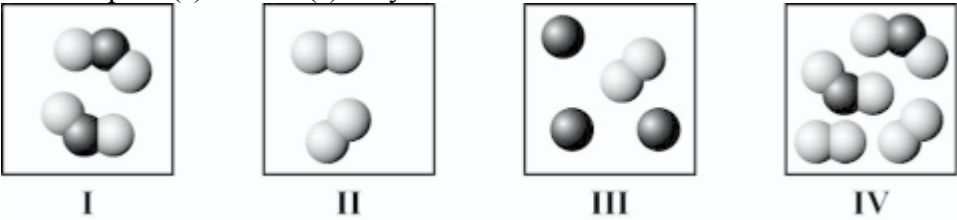


- A. II and III only
- B. III and IV only**
- C. I, III, and IV only
- D. I and IV only

Mixtures will have different substances in the same box.

American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.06  
 Section: 01.07  
 Subtopic: Molecules  
 Subtopic: Properties of Matter  
 Testbank - Testbank Chapter... #27  
 Topic: Components of Matter

28. Which square(s) contain(s) only an element?



- A. I only
- B. II only**
- C. I and II only



D. III and IV only

Elements will only have one type of atom in the box.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.06  
Section: 01.07  
Subtopic: Elements  
Subtopic: Fundamental Definitions  
Testbank - Testbank Chapter... #28  
Topic: Components of Matter

29. Which symbols represent only elements that are metals?

[illegible]

- A.** X and Z
- B. X and Q
- C. P and L
- D. X, R, P, and Q

Non-metals reside in the upper right corner of the periodic table.

American - Chapter 01  
Blooms Level: 2. Understand  
Subtopic: Periodic Table  
Testbank - Testbank Chapter... #29  
Topic: Components of Matter

30. Which symbol(s) represent(s) elements in the noble gas family?

[illegible]

- A. X and Z
- B. P and L
- C.** Q
- D. Y

Noble gases are in the far right column of the periodic table.

American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.06  
Subtopic: Scientific Method  
Testbank - Testbank Chapter... #30  
Topic: Components of Matter

31. Which differentiates a compound from a mixture of two or more elements?

- A. The elements in a compound may be present in varying proportions.
- B.** A compound does not exhibit the individual properties of the elements of which it is composed.
- C. A compound is made up of only one element.
- D. A compound cannot be made up of more than two elements.

Remember that compounds are elements bound together by chemical bonds.

American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.06  
Subtopic: Classification of Matter  
Subtopic: Fundamental Definitions

32. Which substance is an element?

- A.  $\text{NO}_2$
- B.  $\text{NaCl}$
- C.  $\text{N}_2$**
- D.  $\text{CH}_4$

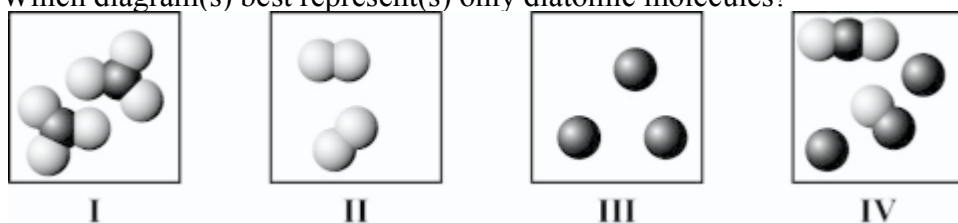
Only one has just one symbol in the formula.

33. A(n) \_\_\_\_\_ is a fixed number of atoms held together by chemical bonds in a certain spatial arrangement.

- A. element
- B. ion
- C. molecule**
- D. mixture

Remember which of these have more than one element that are also bonded together.

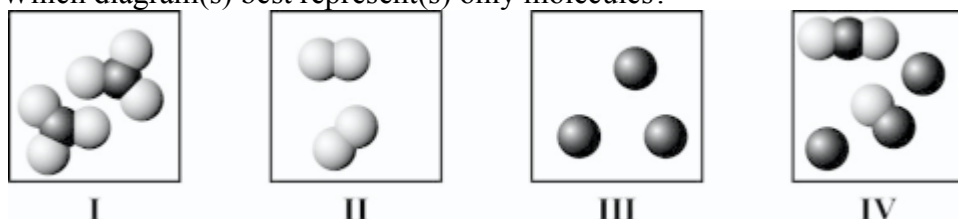
34. Which diagram(s) best represent(s) only diatomic molecules?



- A. I only
- B. II only**
- C. I and II only
- D. II and IV only

The prefix di- means two.

35. Which diagram(s) best represent(s) only molecules?

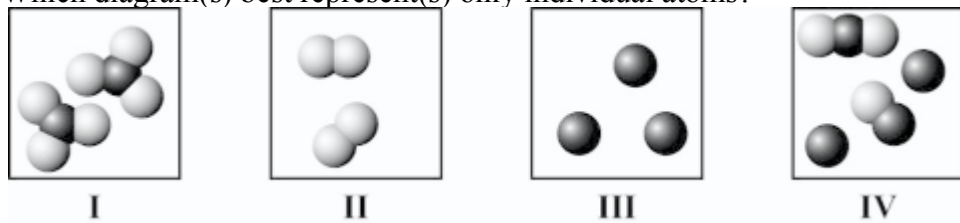


- A. I only
- B. II only
- C. III only
- D. I and II only**
- E. IV only

Molecules have multiple atom bound together.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.07  
 Subtopic: Classification of Matter  
 Subtopic: Elements  
 Subtopic: Molecules  
 Testbank - Testbank Chapter... #35  
 Topic: Components of Matter

36. Which diagram(s) best represent(s) only individual atoms?



- A. I only
- B. II only
- C. III only**
- D. IV only
- E. II and III only

The atoms are not bound to other atoms.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.07  
 Subtopic: Elements  
 Subtopic: Molecules  
 Testbank - Testbank Chapter... #36  
 Topic: Components of Matter

37. Except in the case of hydrocarbons, when naming virtually all compounds made up of two elements, the second element mentioned

- A. ends in "ide."**
- B. is preceded by "mono" (or occasionally "mon").
- C. is always the more metallic element.
- D. is the one present in the greater number of atoms.

Remember that more non-metallic atoms go second and have this ending.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.08  
 Subtopic: Nomenclature  
 Testbank - Testbank Chapter... #37  
 Topic: Components of Matter

38. Based on its name, which carbon compound contains the fewest carbon atoms?

- A. ethanol
- B. methane**
- C. chlorobutane
- D. propyl alcohol

Mother Eats Peanut Butter

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.08  
 Subtopic: Nomenclature  
 Testbank - Testbank Chapter... #38  
 Topic: Components of Matter

39.  $P_2O_5$  is the chemical formula for

- A. pentoxygen diphosphide.
- B. diphosphorus pentoxide.**
- C. dioxygen pentaphosphide.
- D. monophosphorus pentoxide.

See table 1.6 for the naming prefixes.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.08  
 Subtopic: Nomenclature  
 Testbank - Testbank Chapter... #39  
 Topic: Components of Matter

40. The name of the compound formed by combining carbon atoms  with oxygen atoms  to form  is

- A. carbon oxide.
- B. monocarbon dioxide.
- C. carbon dioxide.**
- D. carbonate.

Count your atoms and remember that there is no prefix on a lone element that is named first.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.08  
 Subtopic: Measurements  
 Testbank - Testbank Chapter... #40  
 Topic: Components of Matter

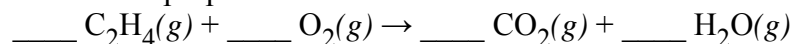
41. During a chemical reaction,

- A. atoms are rearranged.**
- B. some atoms are destroyed and new ones are formed.
- C. some elements are destroyed and new ones are formed.
- D. the law of conservation of matter and mass may be briefly violated.

Remember that the laws of conservation of mass and energy are always followed in chemical reactions.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.09  
 Subtopic: Elements  
 Subtopic: Molecules  
 Testbank - Testbank Chapter... #41  
 Topic: Components of Matter  
 Topic: Study of Chemistry

42. Choose the proper coefficients for each substance to balance this equation.



- A. 1, 1, 2, 2
- B. 1, 3, 2, 2**
- C. 2, 3, 4, 2
- D. 2, 2, 4, 2

Make sure that the total number of each element is the same on both sides of the equation. The large coefficient multiplies through.

American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.09  
 Subtopic: Chemical Formulas  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #42  
 Topic: Chemical Reactions  
 Topic: Components of Matter

43. Choose the proper coefficients for each substance to yield a balanced equation.



- A. 1, 1, 1
- B. 2, 1, 1
- C. 2, 1, 2**
- D. 2, 1, 1

Make sure that the total number of each element is the same on both sides of the equation. The large coefficient multiplies through

American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.09  
 Subtopic: Chemical Formulas  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #43  
 Topic: Chemical Reactions

44. Which is the balanced chemical equation showing hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) decomposing into hydrogen ( $\text{H}_2$ ) and oxygen ( $\text{O}_2$ )?

- A.**  $\text{H}_2\text{O}_2 \rightarrow \text{H}_2 + \text{O}_2$
- B.  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}_2$
- C.  $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}_2$
- D.  $2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2 + \text{O}_2$

Make sure that the total number of each element is the same on both sides of the equation. The large coefficient multiplies through



American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.09  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #44  
 Topic: Chemical Reactions
















45. Which is the balanced chemical equation for the reaction of nitrogen ( $\text{N}_2$ ) with oxygen ( $\text{O}_2$ ) to form NO?

- A.  $2 \text{NO} \rightarrow \text{N}_2 + \text{O}_2$
- B.  $\text{N}_2 + \text{O}_2 \rightarrow \text{NO}$
- C.**  $\text{N}_2 + \text{O}_2 \rightarrow 2 \text{NO}$
- D.  $\text{NO} \rightarrow \text{N}_2 + \text{O}_2$

Make sure that the total number of each element is the same on both sides of the equation. The large coefficient multiplies through

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.09  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #45  
 Topic: Chemical Reactions

46. Which shows the balanced equation for the reaction of nitrogen (  ), as it is normally found in our atmosphere, with oxygen (  ), as it is normally found in our atmosphere, to form nitrogen dioxide?

- A.  +  → 
- B.  +  → 
- C.**  +  +  →  + 
- D.  +  +  → 

Oxygen and nitrogen are diatomic molecules as found in nature.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.09  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #46  
 Topic: Chemical Reactions

47. The two main products of the combustion of gasoline in an automobile engine are

- A. oxygen and carbon monoxide.
- B. sulfur oxides and nitrogen oxides.
- C. sulfur oxides and hydrogen.
- D.** water and carbon dioxide.

All hydrocarbon combustion reactions make these two products.

American - Chapter 01  
 Blooms Level: 1. Remember  
 Section: 01.10  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #47  
 Topic: Chemical Reactions  
 Topic: Environmental Chemistry

48. Green chemistry is

- A. the study of how to improve the production of oxygen via photosynthesis.
- B. any chemistry having an agricultural base.
- C. the cause of the higher temperatures and humidity typically found in greenhouses.
- D.** the design of products and processes that reduce hazardous substances.

This is about cleaner chemistry in all fields.

*American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.05  
Testbank - Testbank Chapter... #48  
Topic: Environmental Chemistry*

49. Catalytic converters reduce the amount of \_\_\_\_\_ in car exhaust.

- A. O<sub>3</sub>
- B. CO<sub>2</sub>
- C.** CO
- D. N<sub>2</sub>

Think about which is a direct tailpipe pollutant.

*American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.10  
Testbank - Testbank Chapter... #49  
Topic: Environmental Chemistry*

50. Ozone is a secondary pollutant. A secondary pollutant is

- A. not as hazardous as a primary pollutant.
- B.** not produced directly but as the product of the interaction of two or more pollutants.
- C. one that is naturally present in our atmosphere.
- D. one that is less hazardous than a primary pollutant.

This has nothing to do with safety.

*American - Chapter 01  
Blooms Level: 1. Remember  
Section: 01.12  
Testbank - Testbank Chapter... #50  
Topic: Environmental Chemistry*

51. There are approximately  $2 \times 10^{22}$  molecules and atoms in each breath we take and the concentration of CO in the air is approximately 9 parts per million. Approximately how many CO molecules are in each breath we take?

- A.  $2 \times 10^{15}$
- B.  $1.8 \times 10^{17}$
- C.**  $2 \times 10^{17}$
- D.  $2 \times 10^{29}$

Remember that "parts per million" means one out of 1,000,000 or for CO, 9 out of 1,000,000.

*American - Chapter 01  
Blooms Level: 3. Apply  
Section: 01.14  
Subtopic: Dimensional Analysis / Unit Conversion  
Subtopic: Measurements  
Subtopic: Scientific Notation  
Testbank - Testbank Chapter... #51  
Topic: Components of Matter*

52. (p. 23) Which of the following would be described as "fine particles"?

- A. SO<sub>x</sub>
- B. NO<sub>x</sub>
- C. O<sub>3</sub>
- D.** 2.5 μm diameter soot

Remember that these are solids and not gases.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.02  
 Subtopic: Classification of Matter  
 Testbank - Testbank Chapter... #52  
 Topic: Components of Matter  
 Topic: Environmental Chemistry

53. Which if the following is the chemical symbol for silver?

- A. Au
- B. Pb
- C. Ag**
- D. Fe

Silver was known during ancient times and has an unusual symbol.

American - Chapter 01  
 Blooms Level: 1. Remember  
 Subtopic: Periodic Table  
 Testbank - Testbank Chapter... #53  
 Topic: Components of Matter

54. Which of the following is a pure substance?

- A. Lemonade
- B. Concrete
- C. Gasoline
- D. Silver wire**

Remember that pure substances have only one component.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.06  
 Subtopic: Classification of Matter  
 Testbank - Testbank Chapter... #54  
 Topic: Components of Matter

55. The lowest (or closest to the ground) layer of our atmosphere is the

- A. troposphere.**
- B. ozone layer.
- C. stratosphere.
- D. mesosphere.

Think about which layer we live in and that is its relative warm.

American - Chapter 01  
 Blooms Level: 1. Remember  
 Section: 01.05  
 Testbank - Testbank Chapter... #55  
 Topic: Environmental Chemistry

56. Which is the following *incorrectly* represents a combustion reaction?

- A.  $2 \text{CH}_4 + 3 \text{O}_2 \rightarrow 2 \text{CO}_2 + 2 \text{H}_2\text{O}$
- B.  $\text{S}_8 + 8 \text{O}_2 \rightarrow 8 \text{SO}_2$
- C.  $\text{N}_2 + 2 \text{O}_2 \rightarrow 2 \text{NO}_2$
- D.  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow 3 \text{CO}_2$**

One of these is missing a product.

American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.09  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #56  
 Topic: Chemical Reactions

57. Balance this equation  $\text{P}_4 + \text{Cl}_2 \rightarrow \text{PCl}_5$  with the smallest whole number coefficients. Choose the answer that is the sum of the coefficients. Do not forget coefficients of "one".

- A. 7

- B. 9
- C. 11
- D. 13
- E. 15**

Be sure to balance all elements on either side of the equation and add all the coefficients including any "ones".

American - Chapter 01  
 Section: 01.09  
 Subtopic: Writing and Balancing Chemical Equations  
 Testbank - Testbank Chapter... #57  
 Topic: Chemical Reactions

58. Which of the following are examples of technological advances that have reduced air pollution?

- ☒ Paint with reduced VOCs
- ☒ Catalytic converters
- ☐ Burning gasoline in leaf blowers
- ☐ \_\_\_\_\_
- ☒ Low sulfur Diesel fuels

One if these is a major cause of outdoor pollution while the others are improvements.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.10  
 Section: 01.11  
 Section: 01.12  
 Testbank - Testbank Chapter... #58  
 Topic: Environmental Chemistry

59. If 500 mL of air contains  $2 \times 10^{22}$  particles (atoms and molecules), how many particles do you inhale in one day if you breathe 15000 L of air?

- A.  $2 \times 10^{22}$
- B.  $6 \times 10^{26}$**
- C.  $1.2 \times 10^{27}$
- D.  $5 \times 10^{24}$

Remember that 500 mL is 0.5L and make sure your units cancel when you do the calculation.

American - Chapter 01  
 Blooms Level: 3. Apply  
 Section: 01.14  
 Subtopic: Dimensional Analysis / Unit Conversion  
 Subtopic: Measurements  
 Subtopic: Scientific Notation  
 Testbank - Testbank Chapter... #59  
 Topic: Components of Matter

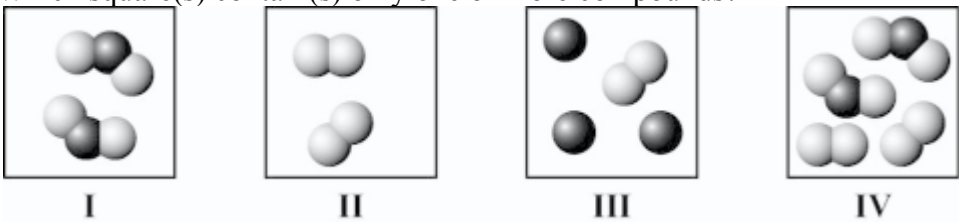
60. If we assume that the top of Mt. Everest is the highest land mass on earth, hikers who scale its summit are standing in the

- A. mesosphere.
- B. stratosphere.
- C. troposphere.**
- D. ozone layer.

Remember that they are still on land and this layer encompasses all the land.

American - Chapter 01  
 Blooms Level: 2. Understand  
 Section: 01.05  
 Testbank - Testbank Chapter... #60  
 Topic: Environmental Chemistry

61. Which square(s) contain(s) only one or more compounds?





- A.** I only
- B. II only
- C. I and IV only
- D. II and III only

Different compounds will have different combinations of different elements.

*American - Chapter 01  
Blooms Level: 2. Understand  
Section: 01.06  
Subtopic: Elements  
Subtopic: Molecules  
Subtopic: States of Matter  
Testbank - Testbank Chapter... #61  
Topic: Components of Matter*

62. The chemical formula for nitrogen monoxide is:

- A.  $\text{N}_2\text{O}$
- B.** NO
- C.  $\text{NO}_2$
- D.  $\text{N}_2\text{O}_3$

Remember your prefixes for naming molecules.

*American - Chapter 01  
Blooms Level: 2. Understand  
Section: 01.07  
Subtopic: Nomenclature  
Testbank - Testbank Chapter... #62  
Topic: Components of Matter*

63. Which correctly pairs an indoor pollutant with its source?

- A. formaldehyde and unvented space heaters
- B.**  $\text{O}_3$  and electrical arcing
- C. radon and glues and solvents
- D. nicotine and paint and paint thinners

Think about the sources of nicotine, radon and formaldehyde.

*American - Chapter 01  
Blooms Level: 2. Understand  
Section: 01.13  
Testbank - Testbank Chapter... #63  
Topic: Environmental Chemistry*

1 Summary

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