Question #: 1

Which state of matter is compressible and allows for molecules to flow past one another?

A. solid
B. liquid
✓ C. gas

Question #: 2

Which of the following is a compound?

✓ A. water
B. oxygen
C. helium
D. air

**Question #: 3**

Which **two** of the following mixtures are homogeneous?

- A. chocolate chip ice cream shake
- ✔ B. soft drink
- ✔ C. dilute saltwater
- D. Mississippi River
- E. noodle soup

**Question #: 4**

Which one is a chemical property?

- A. melting point
- B. color
- ✔ C. toxicity
- D. density

**Question #: 5**

How many centimeters are in 15 kilometers?

- A. 15,000 cm
- B. 150,000 cm
- ✔ C. 1,500,000 cm
- D. 15,000,000 cm

**Question #: 6**

In scientific notation, 0.00614 is **1**.

Report your answer in scientific notation with the format 2.22E2 or 2.22E-2.
Question #: 7

What is the answer to the following calculation?
\[ 4.5 \times 10^6 - 6.7 \times 10^5 = \text{1?} \]

Report your answer with **two** significant figures. Report your answer in scientific notation with the format 2.2E2 or 2.2E-2.

1. 3.8 E6|3.8E6|

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Question #: 8

A 10.00 kg iron bar has dimensions of 200.00 cm x 6.350 cm x 1.000 cm. What is the density of iron?

A. 3.825 g/cm\(^3\)
B. 5.887 g/cm\(^3\)
C. 7.874 g/cm\(^3\)
D. 12.99 g/cm\(^3\)

✓ C. 7.874 g/cm\(^3\)

---

Question #: 9

Which **two** of the following are intensive properties?

A. length
B. density
C. volume
D. color

✓ B. density
✓ D. color

---

Question #: 10

How many significant figures are shown in 1070.030?
Complete the following calculation. Pay particular attention to significant figures and rounding rules.

\[
\frac{(4.623 + 3.42)}{2.40} + (6.092 \times 1.25)
\]

Report your answer to the correct number of significant figures. Only answers with the correct number of significant figures will be counted correct.

1. 10.97

If a runner has a pace of 7.5 miles per hour, how long will it take her to run a 10.0 km race?

A. 44 minutes
B. 47 minutes
C. 50 minutes  
D. 54 minutes

How many mL of water are in a full container that measures 3.5 in\(^3\)?

A. 3.5 mL
B. 57 mL
C. 1.4 mL
D. 43 mL
Question #: 14

Which statement from Dalton's Atomic Theory is now known to be incorrect?

A. Elements are composed of extremely small particles called atoms.
✓B. All atoms of a given element are identical.
C. Compounds are composed of atoms of more than one element.
D. Chemical reactions only involve the rearrangement of atoms.

Question #: 15

Millikan was able to calculate the mass of an electron after he discovered (measured) the ...

A. charge to mass ratio of an electron.
✓B. charge of an electron.
C. mass of the hydrogen atom.
D. charge of a neutron.
E. mass of a proton.

Question #: 16

Which one could Rutherford not conclude by scattering alpha particles from a gold foil?

A. The atom contains a tiny, dense center.
B. The atomic nucleus contains most of the mass of the atom.
✓C. The atomic nucleus contains neutrons and protons.
D. The atomic nucleus is positively charged.

Question #: 17

Isotopes of an element have the same number of __1__, but different numbers of __2__.

1. protons
Question #: 18

The nucleus of a $^{136}\text{Xe}$ atom contains ___ protons and ___ neutrons.

1. 54
2. 82

Question #: 19

The ion of an element with 48 protons in its nucleus has 45 electrons when dissolved in water. What will be the charge on the ion?

Include both a charge (+ or −) and a number in your answer.

1. +3

Question #: 20

Which element is classified as a metalloid?

✓ A. Te
B. S
C. Zn
D. Rn

Question #: 21

What is the charge on the most common ion formed from potassium?

A. +3
B. +2
✓ C. +1
D. −1
An actinide element has three naturally occurring isotopes with masses of 243.99 amu, 244.99 amu, and 245.98 amu and natural abundances of 78.99%, 10.00%, and 11.01%, respectively. What is the atomic mass of this element?

A. 245.81 amu
B. 244.93 amu
C. 244.68 amu
D. 244.31 amu

 Chlorine exists as two naturally occurring isotopes, $^{35}$Cl (34.96 amu) and $^{37}$Cl (36.96 amu). What is the natural abundance of $^{35}$Cl?

A. 75.5 %
B. 26.2 %
C. 35.8 %
D. 73.8 %
E. 50.0 %

In which of the following examples does each species have the same number of neutrons?

A. $^{16}$O, $^{17}$O, $^{18}$O
B. $^{27}$Na, $^{30}$Si, $^{32}$S
C. $^{36}$Ar, $^{36}$Ca, $^{36}$S
D. $^{12}$C, $^{14}$N, $^{16}$O

Question #: 25
How many moles are in 2.278 \times 10^{25} \text{ atoms of boron}\? 
Report your answer with \textbf{four} significant figures. Do \textbf{NOT} include units in your answer.

1. 37.83

Question #: 26

How many atoms are in 228.0 \text{ grams of lead (Pb)}\? 

A. \(2.641 \times 10^{22}\) atoms 
B. \(2.280 \times 10^{23}\) atoms 
C. \(6.022 \times 10^{23}\) atoms 
\(\checkmark\) D. \(6.627 \times 10^{23}\) atoms

Question #: 27

In general, what type of bond occurs between elements from opposite sides of the periodic table?

\(\checkmark\) A. ionic 
B. covalent 
C. elemental 
D. metallic

Question #: 28

Which pair has compounds with the same empirical formula?

A. \(\text{C}_2\text{H}_4\) and \(\text{C}_4\text{H}_4\) 
B. \(\text{CO}\) and \(\text{CO}_2\) 
\(\checkmark\) C. \(\text{C}_3\text{H}_6\) and \(\text{C}_9\text{H}_{18}\) 
D. \(\text{C}_4\text{H}_6\) and \(\text{C}_4\text{H}_{10}\)

Question #: 29

Nitrogen naturally exists in the following form. This is an example of ...
A. an atomic element.
✓B. a molecular element.
C. a molecular compound.
D. an ionic compound.

Question #: 30

Which one of the following contains a polyatomic ion?

A. C_6H_{12}O_6
B. NH_3
✓C. NaHCO_3
D. AlCl_3
Question #: 1

Which state of matter is compressible and allows for molecules to flow past one another?

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