

**DRAFT**  
Do Not Use Until Posted.

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Course Name: -

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Question #: 1

Which choice lists the states of matter in order from least compressible to most compressible?

- A. solid  $\leq$  liquid < gas
  - B. gas < liquid < solid
  - C. gas = liquid < solid
  - D. liquid < solid < gas
- 

Question #: 2

Fill in each blank with one of the following classification terms:  
pure substance, element, compound, or mixture.

Aluminum and sodium chloride (NaCl) are both   1   s.

Air is a(n)   2   .

- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
- 

Question #: 3

Argon is classified as

- A. a compound.
  - B. a heterogeneous mixture.
  - C. an element.
  - D. a homogeneous mixture.
- 

Question #: 4

Which of the following processes describes a physical change?

- A. Milk goes sour when stored at room temperature.
  - B. The liquid propane in a grill evaporates to propane gas because the valve was left open.
  - C. The liquid propane in a grill burns when ignited.
  - D. A bicycle frame rusts upon repeated exposure to air and water.
- 

**Question #: 5**

Which one of the following statements is false?

- A. The total energy of an object is the sum of its kinetic and potential energy.
  - B. Systems tend to change in a manner that raises their potential energy.
  - C. Thermal energy is transferred from hot objects to cold ones.
  - D. Kinetic energy is energy associated with motion.
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**Question #: 6**

Convert the following mass to  $\mu\text{g}$  and report the answer in proper scientific notation.

$$6.53 \times 10^{-4} \text{ g} = \underline{1} \times 10^{\underline{2}} \mu\text{g}$$

- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
- 

**Question #: 7**

Write the number  $4.52 \times 10^{-4}$  in decimal form. 1

- 1. \_\_\_\_\_
- 

**Question #: 8**

Determine the mass of a nickel cube with a 15.0 mm edge length. The density of nickel is 8.91  $\text{g}/\text{cm}^3$ .

Answer:   1   g

1. \_\_\_\_\_

---

**Question #: 9**

Which of the following is an extensive property?

- A. mass
  - B. density
  - C. color
  - D. temperature
- 

**Question #: 10**

What is the result of the following calculation with the correct number of significant figures?

$$12.0540 + 2.052 - 1.5 = \underline{\quad 1 \quad}$$

1. \_\_\_\_\_

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**Question #: 11**

What is result of the following calculation with the correct number of significant figures? Use the form 2.2E-2 for exponential notation.

$$\frac{(5.500 \times 10^{-6})}{(8.05 \times 10^3)(0.0015)} =$$

  1  

1. \_\_\_\_\_

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**Question #:** 12

The fastest measured speed of a football pass is on record as traveling 59 miles per hour. What is the speed of the football in kilometers per hour (km/h)?

1

1. \_\_\_\_\_

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**Question #:** 13

An acetaminophen suspension for infants contains 50.0 mg of the drug per 0.80 mL of suspension.

The recommended dose is 15 mg/kg of body weight.

How many mL of the suspension should be given to an infant weighing 12 pounds?

1 mL

1. \_\_\_\_\_

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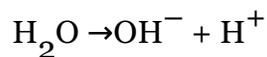
**Question #:** 14

Which statement is a tenet of Dalton's atomic theory that was found to be incorrect with the discovery of isotopes?

- A. Atoms can be broken down into smaller, indivisible particles.
  - B. All atoms of a given element have the same mass.
  - C. Atoms combine in simple, whole-number ratios to form compounds.
  - D. A chemical reaction only changes the way that atoms are bonded together.
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**Question #:** 15

Which statement is **true** about the mass of the reactant ( $\text{H}_2\text{O}$ ) and products ( $\text{OH}^-$  and  $\text{H}^+$ ) in the reaction below?



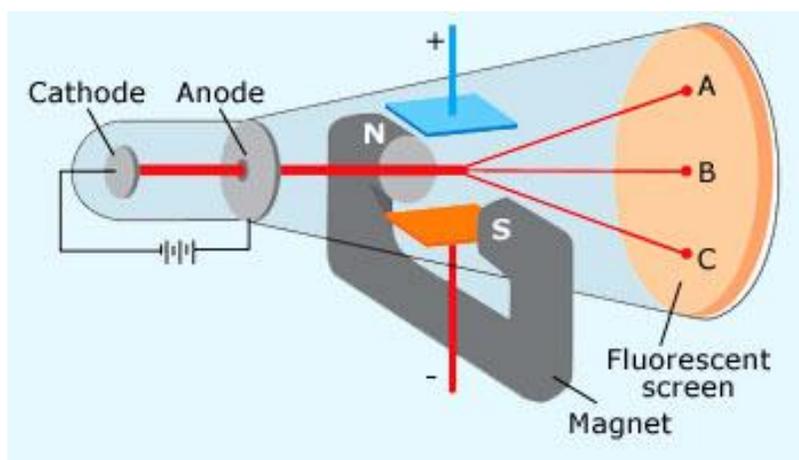
- A. The reactant mass is greater than the total mass of the products.
- B. The reactant mass is less than the total mass of the products.

- C. The reactant mass is equal to the total mass of the products.
- D. The change in mass cannot be determined.

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**Question #:** 16

J.J. Thomson found that cathode rays are deflected by both electric (A) and magnetic (C) fields. Using the apparatus shown, he measured the strengths of electric and magnetic fields that exactly canceled one another, leaving the cathode ray beam undeflected. This experiment yielded what information?

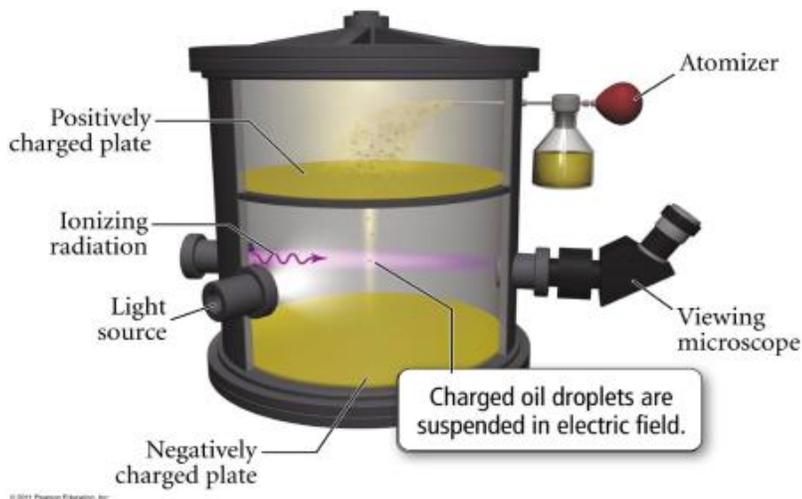


- A. the location of the protons in an atom
- B. the charge of the alpha particle
- C. the charge-to-mass ratio of the electron
- D. the mass of the electron

---

**Question #:** 17

The results of experiments performed using the apparatus shown below were used to



- A. determine the charge-to-mass ratio of a neutron.
- B. calculate the charge of a single electron.
- C. determine the properties of protons.
- D. prove that protons are found in the nucleus of an atom.

**Question #:** 18

Which of the following statements are **true** concerning the structure of the atom as interpreted by Rutherford?

Select **all that apply**.

- A. The volume of the atom is mostly empty space.
- B. Thomson's plum pudding model is correct.
- C. The nucleus contains nearly all of the mass of the atom.
- D. The nucleus of the atom is positively charged.
- E. Neutrons are the source of the positive charge of the nucleus.

**Question #:** 19

Scientists expected the mass of the helium atom to be twice that of the hydrogen atom, but found that it was actually four times the mass of hydrogen.

Chadwick showed that the difference in mass was explained by the presence of \_\_\_\_\_.

- A. electrons in the nucleus
  - B. protons outside of the nucleus
  - C. neutrons in the nucleus
  - D. protons and neutrons outside of the nucleus
- 

**Question #:** 20

The subatomic particle with the smallest mass is the   1   [electron, proton, neutron], which has a   2   [positive, negative, neutral] charge.

- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
- 

**Question #:** 21

Which statement concerning isotopes is **correct**?

- A. Isotopes are formed when an atom loses protons.
  - B. Some isotopes of hydrogen have more than one proton per atom.
  - C. The mass number is given by the adding the number of protons and the number of neutrons.
  - D. The mass number is determined by adding the atomic masses of each isotope.
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**Question #:** 22

When a strontium (Sr) atom forms an ion with the same number of electrons as the nearest noble gas, how many electrons does it gain or lose?

- A. 1 electron is gained
  - B. 1 electron is lost
  - C. 2 electrons are gained
  - D. 2 electrons are lost
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**Question #:** 23

Which of the following pairs of elements have similar chemical properties?

- A. arsenic and krypton
- B. potassium and phosphorus
- C. lead and tin
- D. chlorine and neon

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**Question #: 24**

Calcium (Ca) tends to form a(n)   1   [cation, anion] with a charge of   2  .

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

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**Question #: 25**

Rhenium exists as two naturally occurring isotopes,  $^{185}\text{Re}$  (184.952951 amu) and  $^{187}\text{Re}$  (186.955744 amu). What is the percent abundance of  $^{185}\text{Re}$ ?

- A. 37.73%
- B. 62.60%
- C. 49.66%
- D. 50.34%

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**Question #: 26**

Using the periodic table, you can determine that there are   1   proton(s) in a gold atom and that the average atomic mass of a gold atom is   2   amu.

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

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**Question #: 27**

How are the mole and Avogadro's number related?

- A. 1 mole = Avogadro's number of particles  
B.  $6.022 \times 10^{23}$  moles = Avogadro's number  
C. 1 mole =  $6.022 \times 10^{23}$  g of any element  
D. They are not related in any manner.
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**Question #: 28**

How many moles of tungsten are present in a sample with a mass of 25.0 g?

- A.  $4.60 \times 10^3$  mol  
B. 1.68 mol  
C. 0.136 mol  
D. 7.35 mol
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**Question #: 29**

A 24.91 g sample of an element contains  $5.560 \times 10^{23}$  atoms. What is the molar mass of the element?

- A. 26.98 g/mol  
B. 23.00 g/mol  
C. 30.97 g/mol  
D. 1.008 g/mol
- 

**Question #: 30**

Iron has four stable isotopes with the natural abundances given in the table below. Without performing an exact calculation, approximately how many neutrons are present in 56 g of natural elemental iron?

Isotope	Natural Abundance
$^{54}\text{Fe}$	5.8%
$^{56}\text{Fe}$	91.8%
$^{57}\text{Fe}$	2.1%
$^{58}\text{Fe}$	0.3%

- A. less than Avogadro's number
- B. 56
- C. 30
- D. approximately 30 times Avogadro's number
- E. approximately 56 times Avogadro's number

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- 1. 6.53
- 2. 2

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- 1. 0.000452|.000452|

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1. 1.3|1.31|

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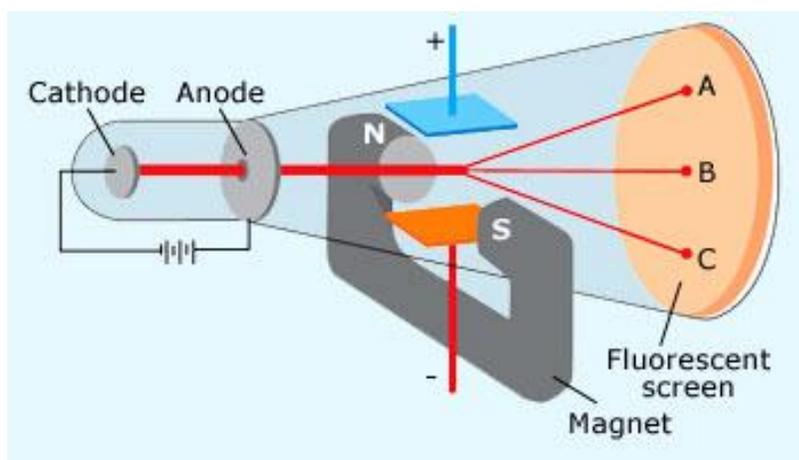
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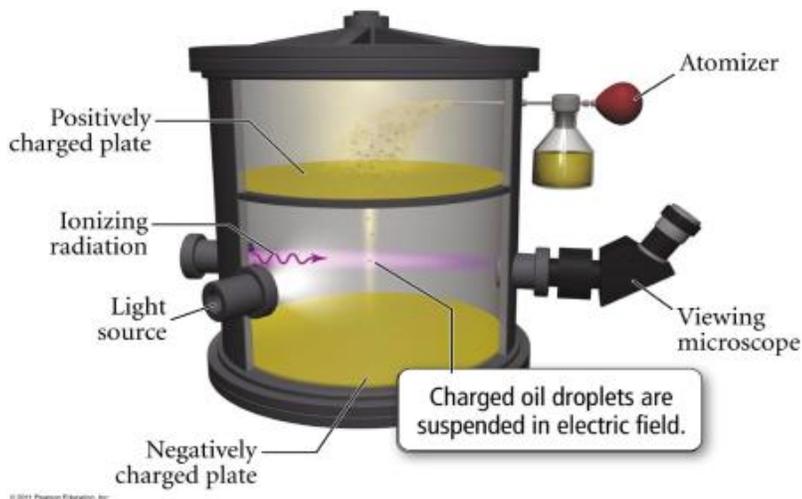


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