

## 2 • Atoms and Elements

### PRACTICE TEST

1. Certain properties are characteristic of metals.

Which property means that you can pound the substance into a foil?

- a) ductility                      c) sectility  
b) conductivity                d) malleability

2. Which of the following is a metalloid?

- a) As    b) Ag    c) S    d) Pb    e) He

3. Which of the following is a transition metal?

- a) Cl    b) Ni    c) P    d) Ca    e) C

4. Which of the following is an alkali metal?

- a) Mg    b) Kr    c) K    d) Al    e) H

5. Which of the following is an lanthanide?

- a) Xe    b) Eu    c) Cd    d) P    e) W

6. Which element has the highest melting point?

- a) Pb    b) Au    c) Os    d) W    e) Hg

7. Cathode rays start at the

- a) negative electrode    c) positive electrode  
b) power source        d) gas inside the tube

8. In a cathode ray tube, electrons are bent toward

- a) a positively charged plate.  
b) a negatively charged plate.

9. Listed below are the charges and masses of four particles. Which one will be deflected the **least** in a mass spectrometer?

- a) +2, 2 amu                      c) +1, 1 amu  
b) +4, 4 amu                      d) +1, 4 amu

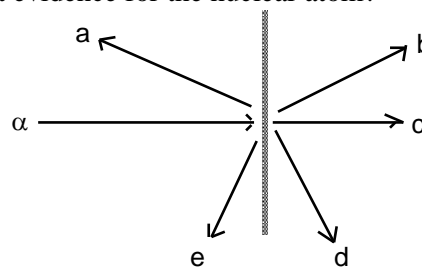
10. In a Millikan oil drop type experiment, the charge on four oil drops (in Coulombs) was found to be:

- 3.33 Coulombs  
8.88 Coulombs  
6.66 Coulombs  
11.10 Coulombs

What is the charge on the electron according to this experiment?

- a) 1.11 Coulomb                c) 4.44 Coulomb  
b) 2.22 Coulomb                d) 11.10 Coulomb

11. Pictured below is a schematic of the Rutherford experiment. Which scattered  $\alpha$ -particle gives the best evidence for the nuclear atom?



- a) a    b) b    c) c    d) d    e) e

12. Which of the following is an isotope of the element with 20 protons ( $p=20$ ) and 22 neutrons ( $n=22$ )?

- a) titanium-22                      c) calcium-40  
b) zirconium-40                    d) titanium-48

13. The imaginary element X has the following natural abundances and isotopic masses. What is the atomic mass of X?

${}^{24}_{12}\text{X}$	24.02 amu	40.0%
${}^{26}_{12}\text{X}$	26.10 amu	60.0%

Show your work:

For questions 14 - 17, use the following key:

(each answer may be used once, more than once,  
or not at all)

- a) alpha
- b) beta
- c) gamma
- d) alpha and beta, but not gamma

14. A high energy form of light

15. Two protons & two neutrons

16. A high speed electron

17. Used by Ernest Rutherford as a “probe”

For questions 18 - 22, use the following key:

(each answer may be used once, more than once,  
or not at all.)

- a) John Dalton
- b) Ernest Rutherford
- c) J.J. Thomson
- d) Democritus

18. His model of the atom has been called the “plum pudding” Model.

19. His model of the atom has been called the “billiard ball” model.

20. He studied matter in cathode ray tubes.

21. His philosophical idea included the term “atomos”.

22. He added to the atomic theory the idea that atoms had positive and negative parts.

23. Consider the following notation:  ${}_{86}^{220}\text{Rn}$

Which statement below is correct?

- a) This particle contains 86 protons
- b) This particle has a mass number of 86
- c) This particle has an atomic number of 220
- d) This particle contains 220 neutrons

24. Which elements did Mendeleev leave spaces for in his periodic table?

\_\_\_\_\_

25. If copper metal is a mixture two isotopes, Cu-63, mass = 62.9298 u and Cu-65, mass = 64.9278 u.

The molar mass of copper is 64.546 g/mole.

Calculate the % abundances of the two isotopes of copper. Show your work.

### **Just For Fun:**

Element names finish these sentences.

- A ridiculous inmate is a \_\_\_\_.
- I bumped my \_\_\_\_ the car door.
- I am sad when all the flowers \_\_\_\_.
- What the police officer does to the crook. \_\_\_\_
- What the doctor does to the patient. \_\_\_\_
- What the undertaker does if the doctor doesn't succeed. \_\_\_\_
- If your cattle get away, \_\_\_\_.
- A famous London theatre is the \_\_\_\_.
- Demonstrations help keep the lectures from getting \_\_\_\_.
- Linoleum, tile, and hardwood are three types of \_\_\_\_.