

Name: _____ Per: ____ Date: _____

Test Review Unit #3: Atomic Theory, Periodic Table and Nuclear Chemistry

Chapter 4: Atoms and the periodic table

- 1) What were the 4 elements of the Greeks?
- 2) Who first named the atom? What does the name mean?
- 3) What are the 4 parts of Dalton's Atomic Theory? Which parts are true?

- 4) What are the 3 parts of the atom, their charges and relative masses?
- 5) Which scientist discovered the electron? Explain his "plum pudding" model?
- 6) Which scientist discovered the dense, positively charged nucleus? What experiment did he complete?
- 7) Who discovered the neutron?
- 8) What is the Bohr model of the atom? How is the modern model different from the Bohr model?
- 9) What are electron orbitals?
- 10) What are valence electrons?
- 11) How many electrons can be found in energy level 1? Energy level 2? Energy level 3? Energy level 4?
- 12) What does the atomic number of an atom represent? What does the mass number represent?
- 13) Fill in the following chart:

Element	Atomic #	Mass #	# of protons	# of electrons	# of neutrons
Copper					
Oxygen					
Lithium					
Carbon-14					

Zinc-66					
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14) How did Dimitri Mendeleev arrange the first periodic table? Why did he leave gaps in the periodic table?

15) How is the modern periodic table arranged?

16) What is periodic law?

17) Complete the following table:

Element	Group #	Period #	Metal/ nonmetal/ metalloid	Number of valence electrons
Oxygen				
Germanium				
Cesium				
Calcium				

18) What is an isotope?

19) Name 2 properties of metals and 2 properties of nonmetals.

20) Fill in the following table:

Group Number	Family Name	Family Characteristic
1		
2		
3-12		
17		
18		

Chapter 9: Radioactive Changes

21) Define Radioactivity:

22) What are the 4 different types of radiation?

23) Which type of radiation:

- A) can't penetrate through a piece of paper
- B) can only be stopped by lead or concrete
- C) is made up of a high energy photon
- D) is an uncharged particle
- E) is an electron
- F) is made of 2 protons and 2 neutrons

24) During alpha decay the atomic mass of the isotope decreases by _____ and the atomic number decrease by _____.

25) Finish the examples of Alpha decay:



26) During beta decay the atomic mass (stays the same, changes) and the atomic number (increases, decreases) by 1.

27) Finish the examples of Beta decay:



28) As beta or alpha particles move through a substance they ionize matter and (gain, lose) energy.

28) What is a half-life?

29) How do scientists use radioactive isotopes to date items?

30) The half-life of iodine-131 is 8.1 days. How long will it take for 7/8ths of the sample of iodine-131 to decay?

31) A sample of Strontium-90 is found to have decayed to 1/8 of its original amount after 87.3 years. What is the half-life of strontium-90?

32) What is the strong force?

33) What happens during fission?

34) What happens during fusion?

Critical thinking Questions (short response)

35) During the “Atom in a Bag” Lab, beads were used to represent the parts of an atom. Blue beads represented protons, red beads represented neutrons, and white beads represented electrons.

A. Susie and Johnny picked up bag letter A and found that it had 19 blue beads, 19 white beads, and 20 red beads. What element was represented by bag A? **Explain** how you knew.

B. Susie and Johnny continued their lab by analyzing bag letter B. They were surprised to find that it also contained 19 blue beads and 19 white beads. The only difference was that bag B contained 22 red beads. What element was represented by bag B? **Explain** how you knew. What would we call this type of atom?

36) Draw a Bohr model of the atom Neon. Be sure to show the protons, neutrons in the nucleus and the electrons.

37) What type of decay is occurring (alpha, beta or gamma)? Write the decay equation.

A) Thorium-219 to Thorium-215

B) Carbon-14 to Nitrogen-14

C) Radium-226 to Radium-226

38)

?																		He
Li	Be											B	?	N	O	F		Ne
?	Mg											Al	Si	P	S	Cl		Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br		Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I		?
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	?	Tl	Pb	Bi	Po	At		Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Uuu	Uub	Uut	Uuq	Uup				

A scientist thought it would be cool to create a periodic table built of shelves with a sample of each element in its correct place in the periodic table. The scientist had built the shelves and had organized all of the elements, except for 5 of them. When the scientist went back to pick up the last 5 elements, she found a leak in the ceiling had dripped on the containers and smeared the labels. The missing elements are: **hydrogen, sodium, mercury, carbon, and xenon**. She labeled each of the missing elements and completed some tests on them.

Element #	Physical properties	Chemical properties
#1	Black, powdery solid	By-product of fires, can form compounds with other elements
#2	Odorless, colorless gas, denser than air	Does not react with other compounds, acids or bases
#3	Shiny, liquid metal	Can form some compounds with other elements
#4	Shiny, soft metal	Reacts with water
#5	Colorless, odorless gas	explodes when ignited with match

From the characteristics listed in the table above, can you determine which known element matches each of the unknown, numbered elements. Please **explain** why you made each choice.