

Chapter 15 Multi-format Test

Modified True/False

Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.

- ____ 1. Elements with similar properties, listed in a single column on the periodic table, form what is called a group.

- ____ 2. A property that can only be observed when one substance changes into a different substance is called a chemical property. _____
- ____ 3. On the periodic table, metals are found, in general, on the left side of the table.

- ____ 4. Solid elements described as dull, brittle, and poor electrical and thermal conductors are most likely metals.

- ____ 5. The group of elements that tend to be found as toxic gases or liquids in their pure form, including chlorine, bromine and iodine, are called the alkali metals. _____
- ____ 6. Properties such as boiling point, phase, density, and specific heat are known as chemical properties.

Completion

Complete each statement.

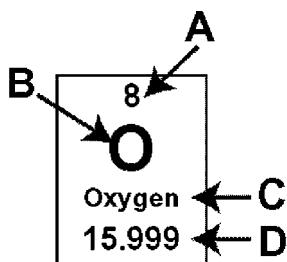
Select the correct term to complete each sentence. There are extra terms in the list.

groups	rows	periods
noble	halogens	metalloids
alkali	nonmetals	periodicity

7. The group identified as inert gases because their atoms do not form chemical bonds with other atoms is also known as the _____ gases.
8. Horizontal rows on the periodic table are called _____.
9. On the periodic table, elements with similar properties are placed in vertical columns called _____.
10. Elements on the periodic table that have properties between metals and non-metals are called _____.
11. Helium belongs to the vertical group on the periodic table known as the _____.
12. When reading across rows of the period table, patterns of chemical and physical properties tend to be repeated. This pattern is called _____.

Matching

For the following element, match the letter with the type of information given.



- ___ 13. name of element
- ___ 14. atomic mass
- ___ 15. symbol
- ___ 16. atomic number

Short Answer

17. Chemical and physical changes represent two ways in which a substance may be altered. Which change is more difficult to reverse?
18. The periodic table was developed by scientists over a number of years after much investigation. What properties were used to organize the periodic table?
19. Two particles found in the nucleus of most atoms have masses equivalent to one atomic mass unit, or 1 amu. Name the particles.
20. Describe the reason the atomic mass of magnesium is listed as 24.31 amu when magnesium has 3 stable isotopes: Mg^{24} , Mg^{25} , and Mg^{26} . Which isotope is the most commonly found on Earth?
21. Which makes a better insulator, metals or nonmetals?

Problem

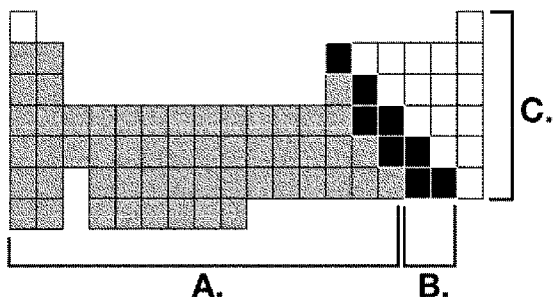
Use the diagram of the periodic table below to answer the following questions.

1																	18						
1																	2						
H																	He						
1 Hydrogen 1.0																	13 Boron 10.8	14 Carbon 12.0	15 Nitrogen 14.0	16 Oxygen 16.0	17 Fluorine 19.0	18 Helium 4.0	
3	4																	5	6	7	8	9	10
Li	Be																	B	C	N	O	F	Ne
2 Lithium 6.9	Beryllium 9.0																	Boron 10.8	Carbon 12.0	Nitrogen 14.0	Oxygen 16.0	Fluorine 19.0	Neon 20.2
11	12																	13	14	15	16	17	18
Na	Mg																	Al	Si	P	S	Cl	Ar
3 Sodium 23.0	Magnesium 24.3																	Aluminum 27.0	Silicon 28.1	Phosphorus 31.0	Sulfur 32.1	Chlorine 35.5	Argon 39.9
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36						
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
4 Potassium 39.1	Calcium 40.1	Scandium 45.0	Titanium 47.9	Vanadium 50.9	Chromium 52.0	Manganese 54.9	Iron 55.8	Cobalt 58.9	Nickel 58.7	Copper 63.5	Zinc 65.4	Gallium 69.7	Germanium 72.6	Arsenic 74.9	Selenium 79.0	Bromine 79.9	Krypton 83.8						
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
5 Rubidium 85.5	Strontium 87.6	Yttrium 88.9	Zirconium 91.2	Niobium 92.9	Molybdenum 95.9	Technetium (97.9)	Ruthenium 101.1	Rhodium 102.9	Palladium 106.4	Silver 107.9	Cadmium 112.4	Indium 114.8	Tin 118.7	Antimony 121.8	Tellurium 127.6	Iodine 126.9	Xenon 131.3						
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86						
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
6 Cesium 132.9	Barium 137.3	Lanthanum 138.9	Hafnium 178.5	Tantalum 180.9	Tungsten 183.8	Rhenium 186.2	Osmium 190.2	Iridium 192.2	Platinum 195.1	Gold 197.0	Mercury 200.6	Thallium 204.4	Lead 207.2	Bismuth 209.0	Polonium (209.0)	Astatine (210.0)	Radon (222.0)						
87	88	89	104	105	106	107	108	109	110	111	112	114		116		118							
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub	Uuq		Uuh		Uuo							
7 Francium (223.0)	Radium (226.0)	Actinium (227.0)	Rutherfordium (261.1)	Dubnium (262.1)	Seaborgium (263.1)	Bohrium (262.1)	Hassium (265)	Meitnerium (266)	Ununnilium (271)	Ununium (272)	Ununbium (277)	Ununquadium (285)		Ununhexium (289)		Ununoctium (293)							
			58	59	60	61	62	63	64	65	66	67	68	69	70	71							
			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu							
			Cerium 140.1	Praseodymium 140.9	Neodymium 144.2	Promethium (144.9)	Samarium 150.4	Europium 152.0	Gadolinium 157.3	Terbium 158.9	Dysprosium 162.5	Holmium 164.9	Erbium 167.3	Thulium 168.9	Ytterbium 173.0	Lutetium 175.0							
			90	91	92	93	94	95	96	97	98	99	100	101	102	103							
			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr							
			Thorium 232.0	Protactinium 231.0	Uranium 238.0	Neptunium (237.0)	Plutonium 244.1	Americium (243.1)	Curium (247.1)	Berkelium (247.1)	Californium (251.1)	Einsteinium (252.1)	Fermium (257.1)	Mendelevium (258.1)	Nobelium (259.1)	Lavrencium (262.1)							

Figure 15-1 The Periodic Table of the Elements

22. Referencing **Figure 15-1**, in which group are the alkali metals located?
23. Referencing **Figure 15-1**, in which group are the noble gases located?
24. Referencing **Figure 15-1**, in which group are the halogens located?
25. Referencing **Figure 15-1**, in which groups are the transition metals located?
26. Referencing **Figure 15-1**, how many energy levels are in a calcium atom?

27. The diagram below represents the periodic table of elements. It is shaded in three tones to represent areas in the periodic table where non-metals, metals and metalloids are located.



Identify the areas in which the three types of elements would be found on the periodic table by placing the letters A, B and C next to the element types.

Non-metal _____ Metal _____ Metalloid _____

Essay

28. Each element is represented on the periodic table by a box containing numbers and a letter or letters. Explain what is meant by each number and the letters for the element sodium, which is represented in the following diagram.

22.990
23
Na
11

29. Give two reasons silicon is of economic importance.
30. What are alloys and why are they widely used? Include two examples of alloys in your answer.

Chapter 15 Multi-format Test Answer Section

MODIFIED TRUE/FALSE

- | | | |
|-----------------------|-------------------|-------------------|
| 1. ANS: T | DIF: basic | REF: section 15.1 |
| 2. ANS: T | DIF: basic | REF: section 15.1 |
| 3. ANS: T | DIF: basic | REF: section 15.1 |
| 4. ANS: F, Non-metals | | |
| | DIF: basic | REF: section 15.1 |
| 5. ANS: F, halogens | | |
| | DIF: intermediate | REF: section 15.1 |
| 6. ANS: F, physical | | |
| | DIF: basic | REF: section 15.1 |

COMPLETION

- | | | |
|----------------------|------------|-------------------|
| 7. ANS: noble | | |
| | DIF: basic | REF: section 15.1 |
| 8. ANS: periods | | |
| | DIF: basic | REF: section 15.1 |
| 9. ANS: groups | | |
| | DIF: basic | REF: section 15.1 |
| 10. ANS: metalloids | | |
| | DIF: basic | REF: section 15.1 |
| 11. ANS: halogens | | |
| | DIF: basic | REF: section 15.1 |
| 12. ANS: periodicity | | |
| | DIF: basic | REF: section 15.1 |

MATCHING

- | | |
|------------|------------|
| 13. ANS: C | DIF: basic |
| 14. ANS: D | DIF: basic |
| 15. ANS: B | DIF: basic |
| 16. ANS: A | DIF: basic |

SHORT ANSWER

17. ANS:
chemical

DIF: basic REF: section 15.1

18. ANS:
chemical properties

DIF: basic REF: section 15.1

19. ANS:
The proton and neutron

DIF: basic REF: section 15.1

20. ANS:
Atomic mass is the average atomic mass for a sample of magnesium found on Earth. Since there are 3 stable isotopes, a sample of magnesium will contain a mixture of all 3. Since the average is 24.31 amu, there is more Mg^{24} than the heavier isotopes.

DIF: advanced REF: section 15.1

21. ANS:
nonmetals

DIF: basic REF: section 15.2

PROBLEM

22. ANS:
group 1

DIF: intermediate REF: section 15.1

23. ANS:
group 18

DIF: intermediate REF: section 15.1

24. ANS:
group 17

DIF: intermediate REF: section 15.1

25. ANS:
groups 3-12

DIF: intermediate REF: section 15.1

26. ANS:
4 energy levels

DIF: intermediate REF: section 15.1

27. ANS:
Non-metal - C Metal- A Metalloid - B

DIF: intermediate REF: section 15.1

ESSAY

28. ANS:
The number **22.990** represents the atomic weight of an “average” sodium atom. The number **23** represents the mass number, the number of protons + neutrons, of the stable isotope of sodium. The letters **Na** represent the chemical symbol for sodium. The number **11** is the atomic number, the number of protons, for sodium.

DIF: intermediate REF: section 15.1

29. ANS:
Answers will vary but may include the following:
- Many gemstones (rubies, emeralds) are compounds of silicon and oxygen with traces of other elements.
 - Window glass is made from silicon and oxygen, pure silica (SiO_2).
 - Silicon crystals in very pure form are used to make semiconductors for computers.

DIF: basic REF: section 15.2

30. ANS:
Alloys are metals mixed with some impurities that generally make the metal much stronger than the elemental metal. For example, mixing carbon with iron produces an alloy used to make nails. Brass is an alloy made from copper and zinc which is much stronger than either of the metals from which it is made.

DIF: intermediate REF: section 15.2

T 1.

 T 2.

 T 3.

 F 4.

 F 5.

 F 6.

 C 13.

 D 14.

 B 15.

 A 16.