chapter 2 practice multiple choice questions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) A molecule of water contains hydrogen and oxygen in a 1:8 ratio by mass. This is a statement of _____. 1) _____

A) the law of constant composition
B) the law of multiple proportions
C) the law of conservation of energy
D) the law of conservation of mass
E) none of the above

2) Which pair of substances could be used to illustrate the law of multiple proportions? 2) _____

A) NaCl, KCl
B) H_2O, O_2
C) CH_4, $C_6H_{12}O_6$
D) SO_2, H_2SO_4
E) CO, CO_2

3) The gold foil experiment performed in Rutherford's lab _____. 3) _____

A) confirmed the plum-pudding model of the atom
B) utilized the deflection of beta particles by gold foil
C) led to the discovery of the atomic nucleus
D) proved the law of multiple proportions
E) was the basis for Thomson's model of the atom

4) Cathode rays are _____. 4) _____

A) protons B) x-rays C) electrons D) neutrons E) atoms

5) Of the following, the smallest and lightest subatomic particle is the _____. 5) _____

A) proton
B) alpha particle
C) nucleus
D) neutron
E) electron

6) All atoms of a given element have the same _____. 6) _____

A) mass
B) density
C) number of protons
D) number of electrons and neutrons
E) number of neutrons

7) Which atom has the smallest number of neutrons? 7) _____

A) fluorine-19
B) neon-20
C) carbon-14
D) oxygen-16
E) nitrogen-14

8) There are _____ electrons, _____ protons, and _____ neutrons in an atom of $^{132}_{54}Xe$. 8) _____

A) 54, 54, 78
B) 78, 78, 132
C) 132, 132, 54
D) 54, 54, 132
E) 78, 78, 54

9) An atom of the most common isotope of gold, ^{197}Au, has _____ protons, _____ neutrons, and _____ electrons. 9) _____

A) 197, 79, 118
B) 79, 118, 118
C) 79, 118, 79
D) 79, 197, 197
E) 118, 79, 39

10) Which isotope has 45 neutrons? 10) _____

A) $^{80}_{35}Br$ B) $^{80}_{36}Kr$ C) $^{34}_{17}Cl$ D) $^{103}_{45}Rh$ E) $^{78}_{34}Se$

11) Isotopes are atoms that have the same number of _____ but differing number of _____. 11) _____

A) protons, neutrons
B) protons, electrons
C) neutrons, electrons
D) neutrons, protons
E) electrons, protons

12) The nucleus of an atom does not contain _____. 12) _____

A) neutrons
B) protons
C) subatomic particles
D) electrons
E) protons or neutrons

13) The nucleus of an atom contains _____. 13) _____

A) protons
B) protons, neutrons, and electrons
C) electrons
D) protons and neutrons
E) neutrons

14) Different isotopes of a particular element contain the same number of _____. 14) _____

A) protons and neutrons
B) protons, neutrons, and electrons
C) subatomic particles
D) protons
E) neutrons

15) In the symbol shown below, x = _____. 15) _____

$$^{13}_{x}C$$

A) 12
B) 7
C) 6
D) 13
E) not enough information to determine

16) In the symbol below, X = _____. 16) _____

$$^{13}_{6}X$$

A) C
B) K
C) N
D) Al
E) not enough information to determine

17) The atomic mass unit is presently based on assigning an exact integral mass (in amu) to an isotope of _____. 17) _____

A) carbon B) helium C) hydrogen D) oxygen E) sodium

18) The element X has three naturally occurring isotopes. The isotopic masses (amu) and % abundances isotopes are given in the table below. The average atomic mass of the element is _____ amu. 18) _____

Isotope	Abundance	Mass
^{53}X	19.61	52.62
^{56}X	53.91	56.29
^{58}X	26.48	58.31

A) 57.23 B) 33.33 C) 56.11 D) 56.29 E) 55.74

19) The element X has three naturally occurring isotopes. The masses (amu) and % abundances of the is 19) _____
are given in the table below. The average atomic mass of the element is _____ amu.

Isotope	Abundance (%)	Mass (amu)
^{15}X	28.60	15.33
^{17}X	13.30	17.26
^{16}X	58.10	18.11

A) 17.11 B) 16.90 C) 16.90 D) 17.20 E) 17.65

20) An unknown element is found to have three naturally occurring isotopes with atomic masses of 35.9675 (0.337%), 37.9627 (0.063%), and 39.9624 (99.600%). Which of the following is the unknown element? 20) _____

A) K
B) Ar
C) Ca
D) Cl
E) None of the above could be the unknown element.

21) Which pair of elements would you expect to exhibit the greatest similarity in their physical and chemical properties? 21) _____

A) H, Li B) C, O C) Ga, Ge D) Ca, Sr E) Cs, Ba

22) Which pair of elements would you expect to exhibit the greatest similarity in their physical and chemical properties? 22) _____

A) Mg, Al B) As, Br C) Br, Kr D) N,O E) I, At

23) Which pair of elements below should be the most similar in chemical properties? 23) _____

A) Cs and He B) C and O C) K and Kr D) I and Br E) B and As

24) An element that appears in the lower left corner of the periodic table is _____. 24) _____

A) either a metal or metalloid
B) definitely a metal
C) definitely a metalloid
D) either a metalloid or a non-metal
E) definitely a non-metal

25) Which one of the following does not occur as diatomic molecules in elemental form? 25) _____

A) nitrogen B) hydrogen C) oxygen D) sulfur E) bromine

26) Which compounds do not have the same empirical formula? 26) _____

A) $C_2H_4O_2$, $C_6H_{12}O_6$
B) C_2H_4, C_3H_6
C) $C_2H_5COOCH_3$, CH_3CHO
D) C_2H_2, C_6H_6
E) CO, CO_2

27) An empirical formula always indicates _____. 27) _____

A) the simplest whole-number ratio of different atoms in a compound
B) how many of each atom are in a molecule
C) the geometry of a molecule
D) which atoms are attached to which in a molecule
E) the isotope of each element in a compound

28) Formulas that show how atoms are attached in a molecule are called _____. 28) _____

A) empirical formulas
B) structural formulas
C) ionic formulas
D) molecular formulas
E) diatomic formulas

29) Which one of the following is most likely to lose electrons when forming an ion? 29) _____

A) N B) F C) P D) Rh E) S

30) Which species has 18 electrons? 30) _____

A) $^{27}Al^{+3}$ B) $^{64}Cu^{+2}$ C) ^{39}K D) ^{35}Cl E) $^{32}S^{-2}$

31) There are _____ protons, _____ neutrons, and _____ electrons in $^{131}I^-$. 31) _____

A) 53, 131, and 52
B) 131, 53, and 52
C) 53, 78, and 54
D) 131, 53, and 54
E) 78, 53, and 72

32) Which of the following compounds would you expect to be ionic? 32) _____

A) CaO B) SF_6 C) H_2O D) NH_3 E) H_2O_2

33) Which pair of elements is most apt to form a molecular compound with each other? 33) _____

A) sulfur, fluorine
B) aluminum, oxygen
C) potassium, lithium
D) barium, bromine
E) magnesium, iodine

34) Which species below is the sulfite ion? 34) _____

A) SO_2^{-2} B) SO_3^{-2} C) SO_4^{-2} D) HS^- E) S^{2-}

35) Which species below is the nitrite ion? 35) _____

A) NO_2^- B) NH_4^+ C) N_3^- D) N^{3-} E) NO_3^-

36) The formula for a salt is XBr. The X–ion in this salt has 46 electrons. The metal X is _____. 36) _____

A) Cd B) Cs C) Pd D) Cu E) Ag

37) The charge on the copper ion in the salt CuO is _____. 37) _____

A) –1 B) –2 C) +2 D) +3 E) +1

38) Which formula/name pair is incorrect? 38) _____

A) $Mg(MnO_4)_2$ magnesium permanganate
B) $Mn(NO_3)_2$ manganese(II) nitrate
C) $Mn(NO_2)_2$ manganese(II) nitrite
D) Mg_3N_2 magnesium nitrite
E) $Mg(NO_3)_2$ magnesium nitrate

39) Which one of the following is the formula of hydrochloric acid? 39) _____

A) $HClO_2$ B) HClO C) HCl D) $HClO_3$ E) $HClO_4$

40) Which one of the following compounds is chromium(III) oxide? 40) _____

A) CrO_3 B) Cr_2O_3 C) Cr_2O_4 D) Cr_3O_2 E) Cr_3O

41) The correct name for MgF_2 is _____. 41) _____

A) magnesium difluoride
B) monomagnesium difluoride
C) manganese difluoride
D) manganese bifluoride
E) magnesium fluoride

42) A correct name for $Fe(NO_3)_2$ is _____. 42) _____

A) iron nitrite
B) ferric nitrite
C) ferrous nitrate
D) ferrous nitrite
E) ferric nitrate

43) The proper formula for the hydronium ion is _____. 43) _____

A) H_3O^+ B) OH^- C) N^{-3} D) H^- E) NH_4^+

44) Which one of the following polyatomic ions has the same charge as the hydroxide ion? 44) _____

A) ammonium
B) carbonate
C) sulfate
D) nitrate
E) phosphate

45) Which element forms an ion with the same charge as the sulfate ion? 45) _____

A) copper
B) oxygen
C) magnesium
D) iron
E) phosphorus

46) The formula for the compound formed between aluminum ions and phosphate ions is _____. 46) _____

A) $Al(PO_4)_3$ B) AlP C) $Al_3(PO_4)_3$ D) $AlPO_4$ E) $Al_2(PO_4)_3$

47) Which metal forms cations of differing charges? 47) _____

A) Sn B) K C) Al D) Cs E) Ba

48) The correct name for Na_2O_2 is _____. 48) _____

A) sodium dioxide
B) sodium peroxide
C) disodium dioxide
D) disodium oxide
E) sodium oxide

49) What is the molecular formula for 1-propanol? 49) _____

A) CH_3OH B) C_4H_9OH C) C_2H_5OH D) $C_5H_{11}OH$ E) C_3H_7OH