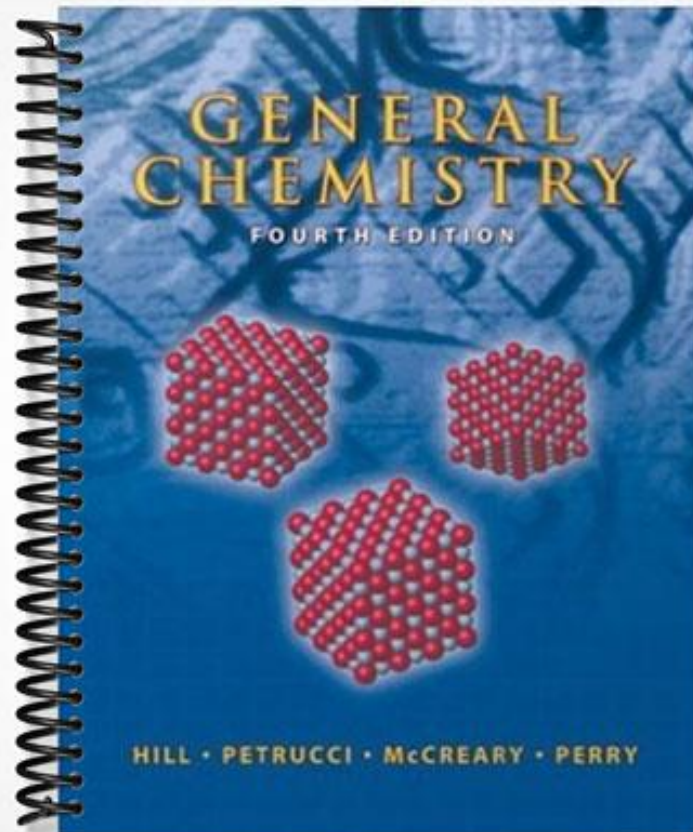


TEST BANK



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

- 1) Taken by itself, the fact that 8.0 g of oxygen and 1.0 g of hydrogen combine to give 9.0 g of water demonstrates what natural law? 1) _____
- A) Multiple proportions
 - B) Periodicity
 - C) The Atomic Theory
 - D) Constant Composition
 - E) Conservation of Mass

- 2) Wherever it is found, water always contains oxygen and hydrogen in the mass ratio of 8 to 1. Taken by itself, this fact demonstrates what natural law? 2) _____
- A) Multiple proportions
 - B) The Atomic Theory
 - C) Constant Composition
 - D) Conservation of Mass
 - E) Periodicity

- 3) Which inventor/discovery is mismatched in the following list? 3) _____
- A) Proust - mass of an electron
 - B) Arrhenius - acids produce H^+
 - C) Lavoisier - Law of Conservation of Mass
 - D) Dalton - Atomic Theory of Matter
 - E) Mendeleev - Periodic Table

- 4) A chlorine-oxygen compound is found to have a chlorine to oxygen mass ratio of 1.109. Which of the following chlorine to oxygen mass ratios is possible for a different chlorine-oxygen compound? 4) _____
- A) 1.214 B) 2.428 C) 5.014 D) 4.437 E) 1.000

- 5) A reaction consumes 5.0 g of A and 6.0 g of B. How many grams of C and D should be obtained? 5) _____



- A) 23
- B) 10
- C) 1
- D) 11
- E) Not enough information is given to answer this question.

- 6) The ratio of the mass of oxygen that combines with 1.0 g of hydrogen in water to the mass of oxygen that combines with 1.0 g of hydrogen in hydrogen peroxide is 1:2. Taken by itself, this fact demonstrates what natural law? 6) _____
- A) Conservation of Mass
 - B) The Atomic Theory
 - C) Constant Composition
 - D) Periodicity
 - E) Multiple proportions

- 7) Which one of the following pairs of substances illustrate the Law of Multiple Proportions? 7) _____
- A) KCl , MgCl_2
 B) O_3 , O_2
 C) SiO_2 , Sb_2O_3
 D) PCl_3 , PCl_5
 E) D_2O , H_2O
- 8) How many neutrons are there in the nucleus of a ^{232}Th atom? 8) _____
- A) 81 B) 232 C) 151 D) 142 E) 90
- 9) What is the mass number of an isotope of mercury that has 122 neutrons? 9) _____
- A) 120 B) 200 C) 80 D) 122 E) 202
- 10) An iron-56 nucleus contains 10) _____
- A) 56 protons and 56 neutrons.
 B) 26 protons and 30 neutrons.
 C) 30 protons and 26 neutrons.
 D) 56 protons and 26 neutrons.
 E) 26 protons and 26 neutrons.
- 11) An atom containing 34 protons, 43 neutrons, and 34 electrons would have the symbol: 11) _____
- A) $^{77}_{\text{Se}}$ B) $^{43}_{\text{Tc}}$ C) $^{43}_{\text{Se}}$ D) $^{77}_{\text{Ir}}$ E) $^{77}_{\text{Tc}}$
- 12) An $^{56}\text{Fe}^{2+}$ particle contains 12) _____
- A) 26 protons, 30 neutrons and 24 electrons.
 B) 54 protons, 56 neutrons and 52 electrons.
 C) 58 protons, 58 neutrons and 56 electrons.
 D) 26 protons, 26 neutrons and 26 electrons.
 E) 28 protons, 28 neutrons and 26 electrons.
- 13) How many neutrons are there in the nucleus of ^{108}Ag ? 13) _____
- A) 61 B) 54 C) 18 D) 108 E) 47
- 14) Which of the following is a pair of isobars? 14) _____
- A) $^{23}_{\text{Na}}$ - $^{24}_{\text{Mg}}$
 B) $^{81}_{\text{Br}}$ - $^{35}_{\text{Cl}}$
 C) $^{14}_{\text{C}}$ - $^{14}_{\text{N}}$
 D) $^{19}_{\text{F}}$ - $^7_{\text{Li}}$
 E) $^1_{\text{H}}$ - $^2_{\text{H}}$
- 15) How many neutrons are in an atom of ^{18}O ? 15) _____
- A) 18 B) 7 C) 8 D) 10 E) 16

- 16) How many protons are in an atom of carbon-13? 16) _____
 A) 7 B) 6 C) 12 D) 2 E) 13
- 17) How many electrons are in an atom of ^{77}Se ? 17) _____
 A) 16 B) 33 C) 76 D) 34 E) 77
- 18) Which of the following pairs of atoms represent isotopes? 18) _____
 A) ^{12}C , ^{14}C
 B) ^{14}N , ^{14}C
 C) ^{77}Se , ^{19}F
 D) ^{79}Br , ^{35}Cl
 E) ^1H , ^{18}O
- 19) What is the mass number of an isotope of lead that has 127 neutrons? 19) _____
 A) 82 B) 252 C) 126 D) 209 E) 207
- 20) Naturally occurring bromine consists of two isotopes: bromine-79 and bromine-81. The atomic mass for bromine is approximately 80. What are reasonable estimates of the relative percentages of bromine-79 and bromine-81, respectively? 20) _____
 A) 75, 25
 B) 90, 10
 C) 10, 90
 D) 50, 50
 E) 25, 75
- 21) Naturally occurring chlorine consists of the two isotopes: chlorine-35 and chlorine-37. The atomic mass for chlorine is approximately 35.5. What are reasonable estimates of the relative percentages of chlorine-35 and chlorine-37, respectively? 21) _____
 A) 75, 25
 B) 33, 67
 C) 67, 33
 D) 25, 75
 E) 50, 50
- 22) Naturally occurring lithium consists of the two isotopes: lithium-6 and lithium-7. The atomic mass of lithium is approximately 6.9. What are reasonable estimates of the relative percentages of lithium-6 and lithium-7, respectively? 22) _____
 A) 10, 90
 B) 90, 10
 C) 75, 25
 D) 25, 75
 E) 50, 50
- 23) Naturally occurring neon consists of the two isotopes neon-20 and neon-22. The atomic mass for neon is approximately 20.2. What are reasonable estimates of the relative percentages of neon-20 and neon-22, respectively? 23) _____
 A) 20, 80
 B) 80, 20
 C) 25, 75
 D) 75, 25
 E) 50, 50

23)

- _____
- A) 10, 90
 - B) 20, 80
 - C) 80, 20
 - D) 90, 10
 - E) 50, 50

24) Which pair of symbols below represents isotopes?

24) _____

- A) ^{16}O , ^{17}O
- B) H, He
- C) He, He⁺
- D) ^{13}C , ^{14}N
- E) ^{16}O , ^{16}N

25) Which statement is incorrect?

25) _____

- A) ^{238}U contains 146 neutrons
- B) ^{18}O has the same number of protons and neutrons
- C) ^{41}K has the same number of protons and electrons
- D) ^{60}Zn has the same number of protons and neutrons
- E) ^{50}Mn has the same number of electrons and neutrons

26) The atomic mass of Al on the C scale is 27.0. On a new scale in which C was assigned an atomic weight of 3.00 instead of 12.0, the atomic weight of Al would be

26) _____

- A) 18.0.
- B) 6.75.
- C) 108.
- D) 4.00.
- E) 9.00.

27) The ratio of atomic mass of element A to that of B is 0.432. If the mass of A is 42.31 what is the mass of B?

27) _____

- A) 105
- B) 18.3
- C) 42.7
- D) 97.9
- E) none of these

28) Typically, the mass of an atom of an element, in grams, is closest to

28) _____

- A) 10^{-10}
- B) 10^{-32}
- C) 10^{23}
- D) 10^{-22}
- E) 1.

29) What is the mass of 1.000 mole of carbon-12?

29) _____

- A) 12.00 g
- B) 1.000 g
- C) 6.000 g
- D) 12.01 g
- E) 14.00 g

- 30) Whose name is associated with the invention of the periodic table? 30) _____
A) Albert Einstein
B) John Dalton
C) Joseph Proust
D) Antoine Lavoisier
E) Dmitri Mendeleev
- 31) Which of the following is a metal? 31) _____
A) Sr B) Si C) Se D) P E) S
- 32) Which of the following is a nonmetal? 32) _____
A) Se B) Sn C) Cs D) Sr E) Sc
- 33) A column of the Periodic Table is called a 33) _____
A) caste.
B) group.
C) homologous series.
D) system.
E) period.
- 34) Which of the following is a metal? 34) _____
A) Ne B) Se C) C D) O E) Na
- 35) Which of the following is a metalloid? 35) _____
A) Ga B) S C) Sn D) In E) Sb
- 36) Which of the following is a nonmetal? 36) _____
A) Br B) Ca C) Ho D) Sb E) Fe
- 37) Which name is incorrect? 37) _____
A) CCl_4 carbon tetrachloride
B) Al_2O_3 dialuminum trioxide
C) N_2O_4 dinitrogen tetroxide
D) SCl_2 sulfur dichloride
E) CS_2 carbon disulfide
- 38) Which one of the following elements does not exist as a diatomic molecule? 38) _____
A) H B) F C) N D) B E) O
- 39) Which of the following compounds is molecular? 39) _____
A) NF_3
B) CuCl_2
C) CdS
D) Fe_2O_3
E) NaOH
- 40) Which name is incorrect? 40) _____
A) KCl potassium chloride
B) BBr_3 boron tribromide

- C) Na_2S disodium sulfide
- D) PCl_5 phosphorus pentachloride
- E) CO_2 carbon dioxide

- 41) Which of the following is not a binary molecular compound? 41) _____
- A) CO
 - B) HI
 - C) NO
 - D) KBr
 - E) N_2O_4
- 42) Which name is incorrect? 42) _____
- A) HBr hydrogen bromide
 - B) FeCl_3 iron (III) chloride
 - C) Ca_3N_2 calcium nitride
 - D) Li_2O dilithium oxide
 - E) MgS magnesium sulfide
- 43) Which of the following compounds is ionic? 43) _____
- A) SeCl_2
 - B) SF_6
 - C) HNO_3
 - D) SOCl_2
 - E) MgO
- 44) Predict the product formed when calcium, Ca, combines with arsenic, As? 44) _____
- A) CaAs
 - B) Ca_2As_3
 - C) Ca_3As_2
 - D) Ca_2As
 - E) CaAs_2
- 45) Which substance is incorrectly labeled? 45) _____
- A) PF_3 a salt
 - B) $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ a hydrate
 - C) H_3PO_4 an acid
 - D) KOH a base
 - E) $\text{C}_3\text{H}_8\text{O}_3$ an organic compound
- 46) Which of the following is the correct formula for iron (III) oxide? 46) _____
- A) Fe_2O_3
 - B) FeO_3
 - C) Fe_3O
 - D) $\text{Fe}(\text{OH})_3$
 - E) Fe_3O_2

47) Which is incorrectly named? 47) _____
A) HIO hypoiodic acid
B) NaOH sodium hydroxide
C) H₃PO₄ phosphoric acid
D) H₂CO₃ carbonic acid
E) H₂SO₃ sulfurous acid

48) Which formula could not be that of an alkane? 48) _____
A) C₁₀H₂₂
B) CH₄
C) C₆H₁₀
D) C₃H₈
E) C₈H₁₈

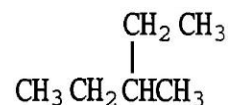
49) Which formula could NOT be that of a cycloalkane? 49) _____
A) C₇H₁₄
B) C₃H₆
C) C₈H₁₆
D) C₁₀H₂₂
E) C₅H₁₀

50) Which statement is incorrect? 50) _____
A) Alkanes are examples of saturated hydrocarbons.
B) Hydrocarbons contain only carbon and hydrogen atoms.
C) Homologs differ from each other by a CH₂ group.
D) Isomers differ from each other by only one carbon atom.
E) In a homologous series, the compounds vary in a regular manner, for example by CH₂ group.

51) Which molecular formula could not belong to the type of compound given? 51) _____
A) C₆H₁₂ cycloalkane
B) C₉H₂₀ alkane
C) C₆H₁₄O alcohol
D) C₅H₁₀O carboxylic acid
E) C₃H₈O₃ alcohol

52) Name the straight chain hydrocarbons shown below in the order given: 52) _____
C₄H₁₀, C₅H₁₂, C₃H₈
A) butane, pentane, ethane
B) propane, hexane, ethane
C) propane, pentane, butane
D) propane, butane, ethane
E) butane, pentane, propane

53) Select the proper systematic name for the following compound:

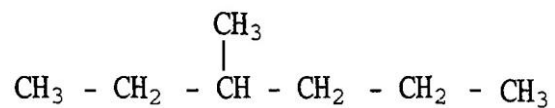


53)

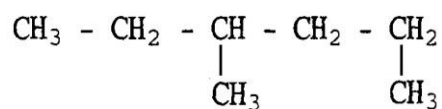
- _____
- A) 3-ethylbutane
 B) isohexane
 C) 3-methylpentane
 D) 3-methylhexane
 E) 2-ethylbutane

54) Which of the following is not an isomer of:

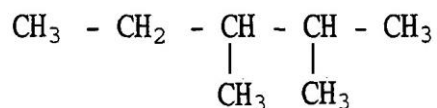
54) _____



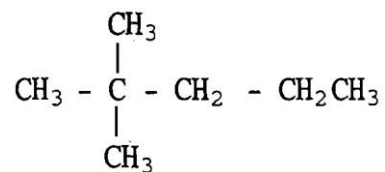
A)



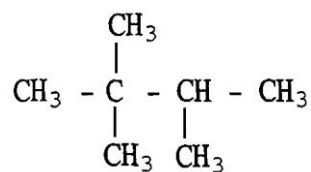
B)



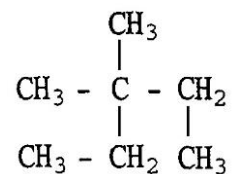
C)



D)

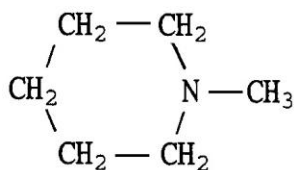


E)

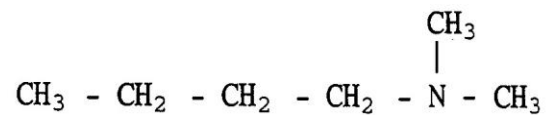


55) Which of the following is an isomer of:

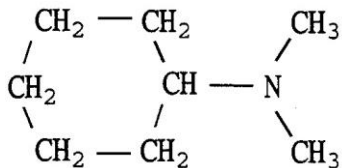
55) _____



A)



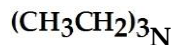
B)



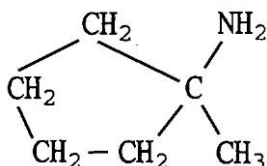
C)



D)



E)

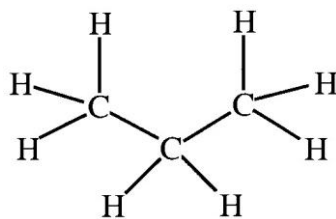


56) Which formula below represents that of an alkane?

- A) C₄H₄
- B) C₅H₁₂
- C) C₂H₆O
- D) C₇H₆O₂
- E) C₂H₂

56) _____

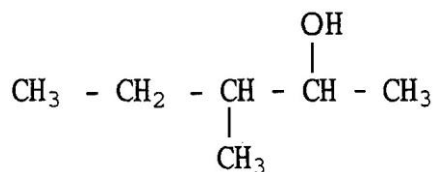
57) Select the proper systematic name for the following compound:



- A) methane
- B) pentane
- C) ethane
- D) propane
- E) butane

57) _____

58) Select the proper systematic name for the following compound.

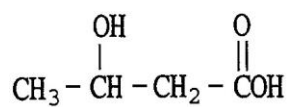


- A) 3-ethyl-2-butanol
- B) 3-methyl-2-hexanol
- C) 3-methyl-2-pentanol
- D) 2-hexanol
- E) 3-methyl-4-pentanol

58) _____

59) Select the proper systematic name for the following compound.

59) _____



- A) 2-hydroxypropanoic acid
- B) 2-hydroxybutane carboxylic acid
- C) 2-hydroxy-propane carboxylic acid
- D) 1-carboxyl-2-hydroxy propane
- E) 3-hydroxybutanoic acid

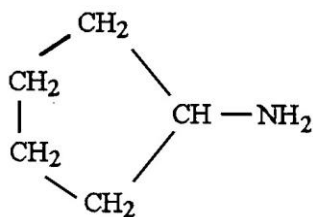
60) Name the functional group in $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$.

60) _____

- A) alcohol
- B) carboxylic acid
- C) alkene
- D) alkane
- E) aldehyde

61) Name the functional group in:

61) _____



- A) alkene
- B) amine
- C) alcohol
- D) cycloalkane
- E) alkane

62) What is the name of the following binary compound?

62) _____



- A) manganese chloride
- B) magnesium chloride
- C) manganese dichloride
- D) magnesium (II) chloride
- E) magnesium dichloride

63) What is the name of the following binary compound?

63) _____



- A) bisaluminum trioxide
- B) aluminum (III) trioxide
- C) dialuminum trioxide
- D) aluminum oxide
- E) dialuminum trioxygen

64) What is the name of the following binary compound? 64) _____



- A) nitrogen oxide
- B) nitrogen (I) oxide
- C) nitrogen dioxide
- D) dinitrogen monoxide
- E) nitride oxide

65) What is the name of the following binary compound? 65) _____



- A) methane
- B) carbon tetrachloride
- C) methylene chloride
- D) carbon (IV) tetrachloride
- E) carbon chloride

66) Gaseous HCl is known as 66) _____

- A) hydride (I) chloride.
- B) hydrochloric acid.
- C) hydrogen monochlorine.
- D) hydrogen chloride.
- E) monohydrogen monochloride.

67) Aqueous HI is known as 67) _____

- A) hydrogen iodide.
- B) hyperiodous acid.
- C) helium iodide.
- D) hydrogen moniodide.
- E) hydroiodic acid.

68) Which of the following compounds could not have the formula C_6H_{14} ? 68) _____

- A) hexane
- B) 2-methylpentane
- C) 2,3-dimethylpentane
- D) 2,3-dimethylbutane
- E) 2,2-dimethylbutane

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

69) The total mass remains constant during a reaction. 69) _____

70) All samples of the same compound, independent of the source, contain the same types of atoms. 70) _____

71) The masses of one element can combine with a fixed mass of a second element in whole number ratios to make two or more compounds of the same two elements. 71) _____

72) Atoms of every element always have equal numbers of protons and electrons. 72) _____

73) The atomic number of an atom indicates the number of electrons on the atom. 73) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

74) Atoms that differ in the number of neutrons are known as _____. 74) _____

75) The number of neutrons in an atom can be determined by subtracting the atomic number from the _____. 75) _____

76) The elements in the periodic table are arranged in groups based on their _____. 76) _____

77) What is the proper way to name an ionic compound? 77) _____

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

78) The mass ratio of calcium to oxygen in calcium oxide is 2.505:1. What mass of calcium oxide will form when 3.64 grams of calcium is completely converted to calcium oxide? 78) _____

A) 1.45 B) 9.12 C) 12.8 D) 5.09 E) 3.87

79) What is the mass (in amu) of an atom if it contains 9 neutrons, 11 protons, and 13 electrons? 79) _____

A) 20 B) 33 C) 22 D) 24 E) 11

80) How many neutrons are present in an atom of mass 37.8, if it contains 18 protons? 80) _____

A) 38 B) 56 C) 18 D) 9 E) 20

81) There are two isotopes of Element X. Their percent abundances and atomic masses are: 81) _____

X-15, 66.6%

X-16, 33.4%

Calculate the weighted average atomic mass in amu.

A) 15.67 B) 15.33 C) 15.33 D) 15.50 E) 9.990

82) An element with two isotopes has a tabulated atomic mass of 119.21 u. One of the isotopes has a mass of 117 u. What is likely to be the mass number of the second isotope? 82) _____

A) 119 B) 121 C) 117 D) 115 E) 116

83) What is the formula for a compound containing fluorine and potassium? 83) _____

A) KF_2 B) KF C) K_2F_2 D) K_3F_3 E) K_2F_3

- 84) Indicate the charge on the sulfite polyatomic ion. 84) _____
A) -1 B) -2 C) -4 D) -3 E) 0
- 85) How many carbon atoms are present in cyclo butane? 85) _____
A) 2 B) 3 C) 6 D) 4 E) 5
- 86) Which of the following is not an alkane? 86) _____
A) C₃H₈
B) C₈H₁₈
C) C₅H₁₂
D) C₃H₆
E) C₁₀H₂₂
- 87) Which of the following is an alkane? 87) _____
A) C₁₀H₂₂O₁₀
B) C₁₀H₁₈
C) C₁₀H₂₀
D) C₁₀H₂₂O
E) C₁₀H₂₂
- 88) If the mass of the only two isotopes of an element are 126.6331 u and 129.1386 u and the weighted average mass is 127.3321 u, what is the relative abundance of the lighter isotope? 88) _____
A) 138.7
B) 817,661.1
C) 27.9
D) 98.1
E) 72.1
- 89) How many electrons are in an element containing 9 neutrons and 11 protons? 89) _____
A) 20 B) 11 C) 3 D) 12 E) 9
- 90) How many protons are in an atom containing 6 neutrons with a mass number of 19 u? 90) _____
A) 25 B) 19 C) 58 D) 6 E) 13
- 91) How many ions of bromide will combine with one ion of aluminum? 91) _____
A) 3 B) 6 C) 4 D) 7 E) 5
- 92) Name the following binary molecular compound: 92) _____



- A) ammonium pentoxide
B) nitrogen pentoxide
C) pentnitrogen oxide
D) nitro pentoxide
E) nitrogen pentoxygen

- 1) E
- 2) C
- 3) A
- 4) D
- 5) D
- 6) E
- 7) D
- 8) D
- 9) E
- 10) B
- 11) A
- 12) A
- 13) A
- 14) C
- 15) D
- 16) B
- 17) D
- 18) A
- 19) D
- 20) D
- 21) A
- 22) A
- 23) D
- 24) A
- 25) B
- 26) B
- 27) D
- 28) D
- 29) A
- 30) E
- 31) A
- 32) A
- 33) B
- 34) E
- 35) E
- 36) A
- 37) B
- 38) D
- 39) A
- 40) C
- 41) D
- 42) D
- 43) E
- 44) C
- 45) A
- 46) A
- 47) A
- 48) C
- 49) D
- 50) D
- 51) D

- 52) E
- 53) C
- 54) A
- 55) E
- 56) B
- 57) D
- 58) C
- 59) E
- 60) A
- 61) B
- 62) B
- 63) D
- 64) D
- 65) B
- 66) D
- 67) E
- 68) C
- 69) TRUE
- 70) FALSE
- 71) TRUE
- 72) TRUE
- 73) TRUE
- 74) isotopes.
- 75) mass number.
- 76) similar physical properties.
- 77) Write the name of the cation followed by the name of the anion.
- 78) D
- 79) A
- 80) E
- 81) C
- 82) B
- 83) B
- 84) B
- 85) D
- 86) D
- 87) E
- 88) E
- 89) B
- 90) E
- 91) A
- 92) B