CHAPTER 0

THE PERIODIC TABLE

0.1 Select from below the atomic symbol for the element Gold is: (a) Go (b) Au (c) G (d) Ca (e) Ol

0.2 Select from below the atomic symbol for the element Calcium is: (a) Go (b) Au (c) G (d) Ca (e) Ol

0.3 The atomic symbol for aluminum is: (a) Al (b) Am (c) A (d) Sn (e) Ag

0.4 The atomic symbol for iron is: (a) Ir (b) Fs (c) Fe (d) In (e) Ir

0.5 Ca is the symbol for: (a) Carbon (b) Calcium (c) Cobalt (d) Copper (e) Cadmium

0.6 Write down the symbol for the following elements: (a) Magnesium (b) Manganese (c) Mercury (d) Molybdenum (e) Neodymium (f) Neon (g) Neptunium (h) Nickel (i) Osmium (j) Palladium

0.7 Write down the symbol for the following elements: (a) Phosphorus (b) Platinum (c) Plutonium (d) Polonium (e) Potassium (f) Radium (g) Radon (h) Rhenium (i) Rhodium (j) Rubidium (k) Ruthenium

0.8 Write down the element names for the following chemical symbols: (a) Sc (b) Se (c) Si (d) Ag (e) Na (f) Sr (g) S (h) Te

0.9 Write down the element names for the following chemical symbols: (a) Tl (b) Th (c) Sn (d) Ti (e) W (f) U (g) V (h) Xe (i) Zn (j) Zr

0.10 Which of the following elements is a metal? (a) Nitrogen (b) Lithium (c) Calcium (d) Iron (e) Iodine

0.11 Which of the following elements is a nonmetal? (a) Nitrogen (b) Lithium (c) Calcium (d) Iron (e) Iodine

0.12 Which of the following elements is a alkali metal? (a) Nitrogen (b) Lithium (c) Calcium (d) Iron (e) Ruthenium

0.13 Which of the following elements is a alkaline earth metal? (a) Nitrogen (b) Lithium (c) Calcium (d) Iron (e) Ruthenium

0.14 Which of the following elements is a halogen? (a) Nitrogen (b) Lithium (c) Calcium (d) Iron (e) Iodine

0.15 Which of the following elements is a chalcogen? (a) Oxygen (b) Lithium (c) Calcium (d) Iron (e) Iodine

0.16 What is the symbol of the element in Period 4 and Group 2? (a) Be (b) Mg (c) Ca (d) C (e) Si

0.17 What is the symbol of the element in Period 2 and Group 2? (a) Be (b) Mg (c) Ca (d) C (e) Si

0.18 Identify the group number described by: (a) Starts with Zn (b) Ends with Ra (c) Contains the elements O, S, and Se (d) Is located to the right of Mn (e) Is located to the left of Ti

0.19 Identify the group number described by: (a) Starts with B (b) Ends with Rn (c) Contains the elements Mn, Tc, and Re (d) Is located to the right of H (e) Is located to the left of F

0.20 Identify the elements located at: (a) group 7A and period 3 (b) An halogen at period 5 (c) An alkaline earth at period 7 (d) An alkali at period 3

0.21 Identify the elements located at: (a) group 2A and period 4 (b) An halogen at period 3 (c) An alkaline earth at period 5 (d) An alkali at period 6

0.22 Identify the elements below as metal, nonmetal or metalloid: (a) B (b) Sb (c) Fe (d) Zn (e) H

0.23 Identify the elements below as metal, nonmetal or metalloid: (a) A shinny element (b) C (c) A electrically conducting element (d) A dull element (e) A semiconductor

Early experiments of the atom

0.24 From the following scientist, J.J. Thomson, Robert Millikan, Henri Becquerel, and Ernest Rutherford, indicate who: (a) Discovered the element Uranium in a mineral (b) Scattered atoms on helium on a gold thin layer (c) Unsuccesfully validated the plum pudding model

0.25 From the following scientist, J.J. Thomson, Robert Millikan, Henri Becquerel, and Ernest Rutherford, indicate who: (a) Worked with cathodic rays (b) Calculate the charge-to-mass ratio of the electron(c) Worked with oil drops to calculate the electric charge of the electron

0.26 Based on Rutherford's experiment, answer the following: (a) What did Rutherford expected after aiming particles to the gold foil? (b) What did Rutherford found after aiming particles to the gold foil?

0.27 Rutherford's scattering experiment was based on: (a) The scattering of alpha particles from gold foil (b) The scattering of beta particles from gold foil (c) The scattering of alpha particles from zinc foil (d) The scattering of gamma particles from iron foil

The Atom

0.28 In an atom, the nucleus contains: (a) an equal number of protons and electrons. (b) all the protons and neutrons (c) all the protons and electrons (d) only neutrons (e) only protons

0.29 In an ion, the nucleus contains: (a) an equal number of protons and electrons. (b) all the protons and neutrons (c) all the protons and electrons (d) only neutrons (e) only protons

0.30 Associate the following statements with either an electron, a proton or a neutron: (a) are found away from the nucleus (b) are atracted to a proton (c) are negatively charged (d) are found in the nucleus

0.31 Associate the following statements with either an electron, a proton or a neutron: (a) are atracted to a electron (b) have the smallest mass (c) are positively charged (d) are neutraly charged

0.32 Indicate whether the following statements are true or false: (a) Neutrons repel to each other (b) Protons and neutrons have opposite charges (c) Electrons repel to each other

0.33 Indicate whether the following statements are true or false: (a) Protons and electrons have opposite charges (b) Protons repel to each other (c) Neutrons and protons have very different mass

0.34 The atomic number of an atom is equal to the number of: (a) nuclei (b) neutrons (c) neutrons plus protons (d) electrons plus protons (e) electrons

0.35 The mass number of an atom is equal to the number of: (a) nuclei (b) neutrons (c) neutrons plus protons (d) electrons plus protons (e) electrons

0.36 Consider a neutral atom with 30 protons and 34 neutrons. The atomic number of the element is: (a) 30 (b) 32 (c) 34 (d) 64 (e) 94

0.37 Consider a neutral atom with 40 protons and 45 neutrons. The mass number of the element is: (a) 40 (b) 45 (c) 80 (d) 85 (e) 94

0.38 Calculate the number of protons, neutrons and electrons in the following isotopes: (a) $^{15}_{7}\mathrm{N}$ (b) $^{64}_{29}\mathrm{Cu}$ (c) $^{93}_{40}\mathrm{Zr}$

0.39 Calculate the number of protons, neutrons and electrons in the following isotopes: (a) $^{79}_{34}\mathrm{Se}$ (b) $^{85}_{36}\mathrm{Kr}$ (c) $^{13}_{7}\mathrm{N}$

0.40 Write down the isotopic symbol given the number of protons, neutrons and electrons: (a) 43 protons, 43 electrons and 60 neutrons (b) 48 protons, 48 electrons and 65 neutrons (c) 77 protons, 77 electrons and 115 neutrons

0.41 Write down the isotopic symbol given the number of protons, neutrons and electrons: (a) 93 protons, 93 electrons and 142 neutrons (b) 55 protons, 55 electrons and 79 neutrons (c) 52 protons, 52 electrons and 72 neutrons

0.42 The atomic mass of Ga is 69.72 amu. There are only two naturally occurring isotopes of gallium: 69Ga, with a mass of 69.0 amu, and 71Ga, with a mass of 71.0 amu. Calculate the natural abundance of the 69Ga isotope.

0.43 The atomic mass of Xe is 131.293 amu. There are only two naturally occurring isotopes of Xe: Xenon-133, with a mass of 133.0 amu, and Xenon-135, with a mass of 135 amu. Calculate the natural abundance of the Xenon-135 isotope.

0.44 Magnesium contains three different isotopes: magnesium-24 with an abundance of 79% and a mass of 23.9850423 amu, magnesium-25 with an abundance of 10% and a mass of 24.9858374 amu, and magnesium-26 with a mass of 25.9825937 amu. Calculate the abundance of magnesium-26 and the average atomic mass of a sample of magnesium.

0.45 Silicon contains three different isotopes: Si-28 with a mass 27.976927amu and abundace of 92.2297%, Si-29 with a mass 28.976495amu and abundace of 4.6832% and Si-30 with a mass 29.973770amu. Calculate the abundance of Si-30 and the average atomic mass of a sample of Si.

AN INTRODUCTION TO MOLECULES

0.46 Calculate the molecular mass of the following compound: CCl_2F_2

0.47 Calculate the molecular mass of the following compound: C_4H_{10}

0.48 Calculate the molecular mass of the following compound: $C_6H_{10}O_8$

0.49 Calculate the molecular mass of the following compound: C_6H_6

EMPIRICAL AND MOLECULAR FORMULAS

0.50 What is the empirical formula of a compound if a sample of this compound contains 2.8 g of nitrogen and 3.2 g of oxygen?

0.51 What is the empirical formula and the molecular formula of a compound if a sample contains 3 g of C, 0.5 H and 4 g of oxygen? MW=60amu

0.52 What is the empirical and molecular formula of a compound with a percent composition of 49.47% C, 5.201% H, 28.84% N, and 16.48% O, if its molecular mass is 194.2 amu.

0.53 A 1.587 g sample of a compound containing N and O was analyzed finding a composition of 0.483 g of Nitrogen and 1.104 g of Oxygen. Calculate the empirical formula of the compound.