Name: _____ Class: _____ Date: _____ ID: A

Mid Term Review

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

____ 1. The two main branches of science are
a. physics and chemistry.
b. natural and social science.
c. natural and physical science.
d. biological and earth science.

____ 2. Technology can best be defined as
a. science that uses computers.
b. new inventions.
c. applied science.
d. the use of lenses and microscopes.

____ 3. A scientific model is a
a. representation of a real event or object.
b. small building used to conduct experiments.
c. mathematical statement of a theory.
d. new theory that takes the place of an incorrect one.

____ 4. Scientists use computer models to study complicated events and to
a. perform experiments.
b. state theories.
c. change theories and laws.
d. make predictions.

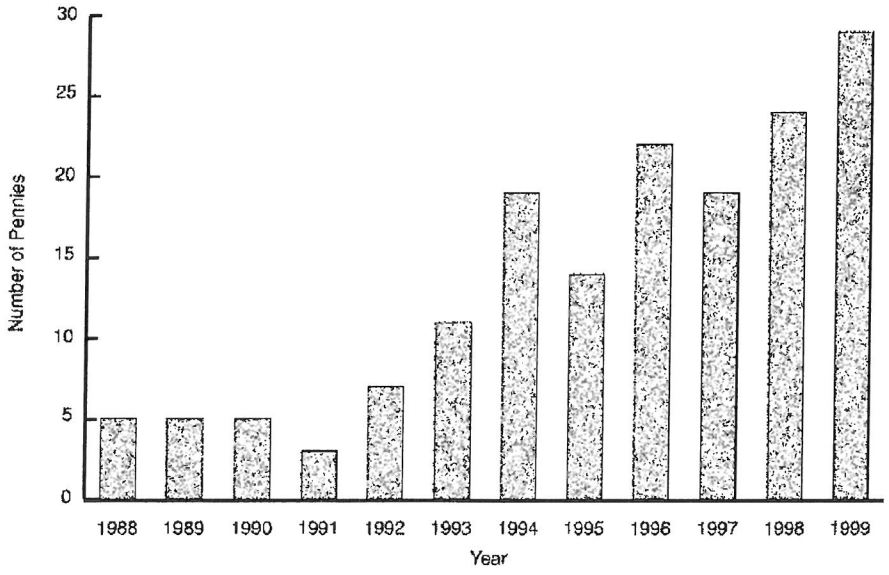
____ 5. Scientists test a hypothesis by
a. formulating questions.
b. designing models.
c. doing experiments.
d. drawing conclusions.

____ ★ 6. Which instrument has been used to detect the oldest, most distant objects in the solar system?
a. light telescope
b. spectroscope
c. particle accelerator
d. radio telescope

____ 7. The SI unit for measuring temperature is the
a. degree.
b. kelvin.
c. mole.
d. ampere.

____ 8. Maria is 123 centimeters tall. Her height in meters is
a. 0123 m.
b. 0.123 m.
c. 1.23 m.
d. 12.3 m.

____ 9. The force with which gravity pulls on a quantity of matter is referred to as
a. mass.
b. length.
c. volume.
d. weight.



Number of Pennies by Year

____ 10. The sample contained the same number of pennies for which two years?
a. 1988 and 1992
b. 1988 and 1991
c. 1994 and 1997
d. 1994 and 1998

____ 11. The decimal equivalent of 10^{-2} is
a. 100.
b. 10.
c. 0.1.
d. 0.01.

____ 12. What is 78,900,000,000 expressed in scientific notation?
a. 789×10^9
b. 7.89×10^9
c. 7.89×10^{10}
d. 7.89×10^{11}

____ 13. You are asked to find the volume of a cube that is 2.5 cm high, 2.65 cm wide, and 3.456 cm long. How many significant figures should you show in your answer?
a. 1
b. 2
c. 3
d. 4

____ 14. A measurement that is accurate is one that
a. is as exact as possible.
b. is close to the true value.
c. contains at least four significant figures.
d. contains five decimal places.

____ 15. Matter is defined as anything that
a. can be seen and touched.
b. has mass and takes up space.
c. can be weighed.
d. contains kinetic or potential energy.

____ 16. The science of what matter is made of and how it changes is called
a. chemistry.
b. physics.
c. kinetics.
d. engineering.

____ 17. A substance that cannot be broken down into simpler substances is
a. a compound.
b. a mixture.
c. an element.
d. an atom.

____ 18. You put 1 gram of salt into 1 liter of water and stir. The resulting liquid is an example of
a. a pure substance.
b. a heterogeneous mixture.
c. a homogeneous mixture.
d. an immiscible mixture.

____ 19. The chemical symbol for sulfuric acid is H_2SO_4. How many atoms are contained in each molecule of sulfuric acid?
a. 3
b. 5
c. 6
d. 7

____ 20. Knowing the chemical properties of a substance will tell you how the substance
a. looks.
b. smells.
c. can be broken down into atoms.
d. reacts with other substances.

____ 21. Which state of matter will hold its shape without a container?
a. solid
b. liquid
c. gas
d. plasma

____ 22. A substance has a mass of 360 g and a volume of 7.5 cm^3. What is its density?
a. 2700 g/cm^3
b. 270 g/cm^3
c. 480 g/cm^3
d. 48 g/cm^3

____ 23. Which of the following is an example of a physical change?
a. dissolving salt in water
b. burning wood into charcoal
c. cooking an egg
d. rusting iron

____ 24. Digesting food is an example of
a. physical change.
b. change of state.
c. chemical change.
d. buoyancy.

____ 25. Temperature is a measure of the average _____ energy of the particles in the object.
a. thermal
b. kinetic
c. potential
d. chemical

____ 26. Which state of matter has a definite volume, but not shape?
a. plasma
b. gas
c. liquid
d. solid

____ 27. All matter is made of atoms and molecules that are
a. fixed in position.
b. in motion, but never collide.
c. motionless.
d. None of the above

____ 28. The resistance of a fluid to flow is referred to as
a. pressure.
b. energy.
c. viscosity.
d. shape.

____ 29. Which state of matter will hold its shape without a container?
a. solid
b. liquid
c. gas
d. plasma

____ 30. The change of a substance from a solid directly to a gas is called
a. condensation.
b. evaporation.
c. melting.
d. sublimation.

____ 31. Evaporation refers to the change of state from a
a. liquid to a gas.
b. gas to a liquid.
c. solid to a liquid.
d. liquid to a solid.

____ 32. The law of conservation of mass states that mass cannot be
a. burned.
b. changed in form.
c. created or destroyed.
d. heated or cooled.

____ 33. Boyle's law relates the pressure of a gas to its
a. container.
b. volume.
c. molecular composition.
d. temperature.

____ 34. Buoyant force is the _____ force exerted on an object immersed or floating on a liquid.
a. lateral
b. upward
c. downward
d. tensile

____ 35. As the temperature of a fixed amount of gas at constant volume decreases, its pressure
a. decreases.
b. stays the same.
c. increases.
d. None of the above

____ 36. As the volume of a fixed amount of gas at constant temperature decreases, its pressure
a. decreases.
b. stays the same.
c. increases.
d. Insufficent data to answer question

____ 37. Dalton's atomic theory was accepted because
a. there was evidence to support it.
b. Democritus said that it was correct.
c. Dalton invented the electron microscope.
d. Dalton showed how molecules are formed.

____ 38. Which statement about the atomic nucleus is correct?
a. The nucleus is made of protons and neutrons and has a negative charge.
b. The nucleus is made of protons and neutrons and has a positive charge.
c. The nucleus is made of electrons and has a positive charge.
d. The nucleus is made of electrons and has a negative charge.

____ 39. Atoms have no electric charge because they
a. have an equal number of charged and noncharged particles.
b. have neutrons in their nuclei.
c. have an equal number of electrons and protons.
d. have an equal number of neutrons and protons.

____ 40. According to Bohr's model of the atom, electrons behave like
a. planets orbiting the sun.
b. waves on a vibrating string.
c. light energy in a vacuum.
d. planets rotating on their axes.

____ 41. According to Bohr's theory, an electron's path around the nucleus defines its
a. electric charge.
b. atomic mass.
c. energy level.
d. speed.

____ 42. Valence electrons determine an atom's
a. mass.
b. chemical properties.
c. electric charge.
d. period.

____ 43. Ionization refers to the process of
a. changing from one period to another.
b. losing or gaining protons.
c. turning lithium into fluorine.
d. losing or gaining electrons.

____ 44. An atom's mass number equals the number of
a. protons plus the number of electrons.
b. protons plus the number of neutrons.
c. protons.
d. neutrons.

____ 45. Which statement about the alkali metals is correct?
a. They are located in the left-most column of the periodic table.
b. They are extremely nonreactive.
c. They are usually gases.
d. They form negative ions with a 1- charge.

____ 46. Alkali metals are extremely reactive because they
a. have very small atomic masses.
b. are not solids at room temperature.
c. have one valence electron that is easily removed to form a positive ion.
d. have two valence electrons that form compounds with calcium and magnesium.

____ 47. Which statement about noble gases is correct?
a. They form compounds with very bright colors.
b. They exist as single atoms rather than as molecules.
c. They are highly reactive with both metals and nonmetals.
d. They are extremely rare in nature.

____ 48. Most halogens form compounds by
a. gaining an electron to form a negative ion.
b. losing an electron to form a positive ion.
c. losing protons.
d. joining with both calcium and carbon.

____ 49. Group 18 noble gases are inert because
a. they readily form positive ions.
b. they can have either a positive or a negative charge.
c. their outermost energy level is missing one electron.
d. their outermost energy level is full.

____ 50. Carbon and other nonmetals are found in which area of the periodic table?
a. on the left-most side
b. on the right side
c. in the middle column of the periodic table
d. in the bottom rows

____ 51. Transition metals such as copper or tungsten form compounds by
a. gaining electrons to form negative ions.
b. losing electrons to form positive ions.
c. losing neutrons.
d. changing shape and color at various temperatures.

____ 52. A mole is an SI base unit that describes the
a. mass of a substance.
b. amount of a substance.
c. volume of a substance.
d. electric charge of a substance.

____ 53. Avogadro's constant is defined as the number of particles in
a. one mole of a pure substance.
b. one liter of a pure substance.
c. one gram of a pure substance.
d. one kilogram of a pure substance.

____ 54. Molar mass is defined as
a. the number of particles in 1 mole of a substance.
b. the SI base unit that describes the amount of a substance.
c. the amount of a substance necessary to have a positive charge.
d. the mass in grams of 1 mole of a substance.

____ 55. The average atomic mass of potassium is approximately 39 amu. What is the mass of 2.0 mol of potassium?
a. 0.39 g
b. 0.78 g
c. 39 g
d. 78 g

____ 56. You have 6.50 mol of chromium, which has a molar mass of approximately 52 g/mol. What is the mass in grams of this amount of chromium?
a. 3.38 g
b. 33.8 g
c. 338 g
d. 3.38 kg

____ 57. What is the mass in grams of 0.75 mol of sulfur, which has a molar mass of approximately 32 g/mol?
a. 16 g
b. 24 g
c. 32 g
d. 240 g

____ 58. The forces that hold different atoms or ions together are
a. electric currents.
b. chemical bonds.
c. physical bonds.
d. nuclear forces.

____ 59. A compound differs from a mixture because it
a. always remains frozen even at high temperatures.
b. is formed from two cations.
c. always contains the same elements in the same proportion.
d. can form only in the presence of heat energy.

____ 60. Each molecule of hydrochloric acid, HCl, contains one atom of hydrogen and
a. one atom of chlorine.
b. one atom of oxygen.
c. two atoms of chlorine.
d. two atoms of oxygen.

____ 61. In which substance do the molecules have the strongest attractions to one another?
a. sugar, a solid
b. hydrogen, a gas
c. sulfuric acid, a liquid
d. water, a liquid

____ 62. An ionic bond is a bond that forms between
a. ions with opposite charges.
b. atoms with neutral charges.
c. one atom's nucleus and another atom's electrons.
d. the electrons of two different atoms.

____ 63. Covalent bonds are formed between
a. ions.
b. metal atoms.
c. nonmetal atoms.
d. compounds.

____ 64. Copper is a good conductor of electricity because its electrons
a. are positively charged.
b. are free to move from atom to atom.
c. can take on either positive or negative charges.
d. are shared between neighboring compounds.

____ 65. Solid ionic compounds have very high melting points because they
a. are positively charged.
b. contain metallic elements.
c. are made of elements that are solid at room temperature.
d. contain charged ions that are locked tightly together.

____ 66. The anion formed from an oxygen atom is called a(n)
a. oxygen ion.
b. oxide ion.
c. carbon dioxide.
d. nitrous oxide.

____ 67. Fe_2O_3 is named *iron (III) oxide* because it contains
a. three oxygen atoms.
b. Fe^{3+} ions.
c. three iron atoms.
d. O^{3+} ions.

____ 68. When copper combines with oxygen to form copper (II) oxide, the charge of the copper ion is
a. Cu^{1+}.
b. Cu^{2+}.
c. Cu^{3+}.
d. Cu^{4+}.

____ 69. When nickel combines with fluorine to form nickel (III) fluoride, the charge of the nickel ion is
a. Ni^{1+}.
b. Ni^{2+}.
c. Ni^{3+}.
d. Ni^{4+}.

____ 70. The name for the compound with the formula $CuBr_2$ would be written as
a. copper(II) bromide.
b. copper(I) bromide.
c. copper bromine.
d. copper(III) bromide.

____ 71. The simplest organic compound is
a. aspirin.
b. table sugar.
c. salt.
d. methane.

____ 72. Alcohols are organic compounds that contain
a. carbon and oxygen only.
b. carbon and hydrogen only.
c. carbon, oxygen, and hydrogen.
d. carbon, nitrogen, and hydrogen.

____ 73. Polymers are large organic molecules that are made of
a. cations.
b. anions.
c. carbon and oxygen only.
d. repeating units.

____ 74. A protein is a polymer that is made of
a. simple sugars.
b. nitrogen and carbon dioxide.
c. amino acids.
d. DNA.

____ 75. The "rings" of the DNA "ladder" are made up of
a. paired monomers.
b. sugar molecules.
c. phosphates.
d. amino acids.

____ 76. A change in the color of a solution is a sign that
a. a chemical change is taking place.
b. a physical change has just occurred.
c. oxygen is present.
d. organic chemicals are present.

____ 77. A substance that undergoes a change in a chemical reaction is
a. a product.
b. a chemical.
c. a reactant.
d. an enzyme.

____ 78. What happens in a chemical reaction?
a. Atoms are destroyed.
b. Atoms are created.
c. Molecules are created.
d. Atoms are rearranged.

____ 79. In an exothermic reaction, energy is transferred from
a. the reactants to the surroundings.
b. the surroundings to the reactants.
c. one reactant to another.
d. the container to the chemicals.

____ 80. Which statement about endothermic reactions is correct?
a. Energy is always created in the form of heat.
b. Energy is transferred from the surroundings to the reactants.
c. Energy is used to force electrons to move to higher energy levels.
d. Energy is transferred from the reactants to the surroundings.

____ 81. Chemical energy is energy that is
a. added to a reaction in the form of heat.
b. present within atoms and molecules.
c. caused by the movement of electricity.
d. released only when oxygen is present.

____ 82. The energy source in photosynthesis is
a. light energy.
b. chemical energy.
c. heat energy.
d. kinetic energy.

____ 83. A synthesis reaction is a reaction between at least two compounds in which
a. one breaks down into at least two products.
b. a compound is decomposed by an electric current.
c. a compound burns in the presence of oxygen.
d. a new, more complex compound is formed.

____ 84. What kind of reaction occurs when potassium is placed in water?
a. a single-displacement reaction
b. a double-displacement reaction
c. a decomposition reaction
d. electrolysis

____ 85. Which of the following is an example of a decomposition reaction?
a. photosynthesis
b. digestion
c. polymerization
d. exchange of ions between two compounds

____ 86. The product of the synthesis reaction between sodium and chlorine gas is
a. polyethylene.
b. carbon dioxide.
c. sodium chloride.
d. copper (II) chloride.

____ 87. When water is broken down by electrolysis, the products are
a. water and carbon dioxide.
b. hydrogen and oxygen ions.
c. hydrogen gas and oxygen gas.
d. oxygen and methane.

____ 88. In a redox reaction, the substance that accepts electrons is said to be
a. reduced.
b. oxidized.
c. electrified.
d. clarified.

____ 89. Which of the following is an example of a heterogeneous mixture?
a. salt water
b. vinegar
c. sugar solution
d. mayonnaise

____ 90. A heterogeneous mixture is one that is *not*
a. uniform throughout.
b. easily mixed together.
c. made of two or more liquids.
d. edible by humans.

____ 91. Which of the following is a homogeneous mixture?
a. salad dressing
b. gelatin
c. rubbing alcohol
d. orange juice with pulp

____ 92. A mixture that separates into different layers when you stop stirring it is
a. a colloid.
b. a suspension.
c. a solution.
d. an emulsion.

____ 93. The particles in a colloid remain dispersed throughout the mixture because they
a. are extremely small.
b. have a positive charge.
c. have a negative charge.
d. are of different sizes.

____ 94. Which statement about solutions is *incorrect*?
a. Liquids that mix to form a single layer are said to be miscible.
b. Solutions can be made of liquids and solids, liquids and liquids, or gases and liquids.
c. In a solution, the solvent is dissolved into the solute.
d. Solutions will not separate under normal circumstances.

____ 95. You can usually separate out a suspension by
a. pouring off the liquid.
b. freezing the suspension.
c. distilling the entire suspension.
d. using a paper filter to catch the particles.

____ 96. You can skim the fat off the top of a kettle of cold soup because fat is
a. made of small particles.
b. less dense than water and rises to the top.
c. an emulsion that remains dispersed throughout the soup.
d. made of large particles that will not pass through a filter.

____ 97. Distillation can be used to separate solutions of miscible liquids because
a. different liquids usually have different boiling points.
b. boiling breaks the chemical bonds within each liquid.
c. denser liquids sink to the bottom.
d. solids remain after the liquids are boiled away.

____ 98. Solubility refers to the
a. size of the particles that make up a substance.
b. grams of solute per 100 g of solvent.
c. number of moles of solvent dissolved per liter of solution.
d. concentration of a solute that is actually dissolved in a solvent.

____ 99. Loose sugar dissolves much faster than a sugar cube because loose sugar has
a. a greater surface area.
b. less kinetic energy.
c. a higher temperature.
d. a greater surface tension.

____ 100. Sugar will dissolve more quickly in iced tea if you stir it because stirring
a. absorbs kinetic energy.
b. allows dissolved molecules to diffuse through the tea.
c. increases the solubility of the solution.
d. changes the electric charges of the water molecules.