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| 1. Modern research requires   |  |  |  | | --- | --- | --- | |  | a. | communication skills | |  | b. | collaboration skills | |  | c. | knowledge in a particular field | |  | d. | a willingness to think about the world | |  | e. | all of the choices above |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.1 Why Care About Chemistry? | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 2. For a chemist, understanding a chemical reaction means:   |  |  |  | | --- | --- | --- | |  | a. | knowing what makes up a reacting atom. | |  | b. | knowing what atoms make up a reacting molecule. | |  | c. | knowing how atoms in a reacting molecule are connected together. | |  | d. | having a mental picture of how reacting molecules interact with each other. | |  | e. | both a and b. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.1 Why Care About Chemistry? | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 3. Removing arsenic from drinking water requires   |  |  |  | | --- | --- | --- | |  | a. | knowledge of arsenic’s chemical behavior | |  | b. | patent’s to protect consumers | |  | c. | knowledge of arsenic’s chemical toxicity | |  | d. | medical histories of consumers | |  | e. | knowledge of the history of the water source |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.2 Cleaning Drinking Water | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 4. Which of the following is a qualitative statement?   |  |  |  | | --- | --- | --- | |  | a. | Water is a molecule composed of hydrogen and oxygen atoms. | |  | b. | The density of ice at 0°C is 0.917 g/mL. | |  | c. | A can of soda has a volume of 355 mL. | |  | d. | A necklace is 58.3% gold. | |  | e. | The melting point of lead is 327.5°C. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 5. Which of the following contains both a quantitative and a qualitative information?   |  |  |  | | --- | --- | --- | |  | a. | The compound has a mass of 14.62 g. | |  | b. | The compound formed pale yellow crystals. | |  | c. | The drug is 92.5% pure. | |  | d. | The reaction produced 112 g of a pure white solid. | |  | e. | The compound melted. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 6. A law is a:   |  |  |  | | --- | --- | --- | |  | a. | unifying principle that explains a body of facts. | |  | b. | statement summarizing a group of scientific facts. | |  | c. | possible explanation of observations. | |  | d. | theory based solely on qualitative observations. | |  | e. | statement that includes a measurement or number. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 7. What is a possible explanation of observations called?   |  |  |  | | --- | --- | --- | |  | a. | model | |  | b. | theory | |  | c. | hypothesis | |  | d. | qualitative statement | |  | e. | law |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 8. A unifying principle that explains a body of facts is a:   |  |  |  | | --- | --- | --- | |  | a. | hypothesis. | |  | b. | qualitative statement. | |  | c. | law. | |  | d. | theory. | |  | e. | model. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 9. A statement that includes a measurement or number is a:   |  |  |  | | --- | --- | --- | |  | a. | qualitative statement. | |  | b. | hypothesis. | |  | c. | model. | |  | d. | law. | |  | e. | quantitative statement. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 10. In science, a model is useful because it   |  |  |  | | --- | --- | --- | |  | a. | confirms the validity of a theory | |  | b. | makes a theory more concrete | |  | c. | predicts which theories are correct | |  | d. | confirms the existence of molecules | |  | e. | makes assumptions about things we can’t see |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.3 How Science is Done | | *OTHER:* | Comprehension | | *NOTES:* | Predict consequences | |

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| 11. The freezing point and boiling point of water are often used to calibrate thermometers. Give those temperatures in degrees Celsius.   |  |  |  | | --- | --- | --- | |  | a. | 273°C and 373°C | |  | b. | 100°C and 273°C | |  | c. | 32°C and 212°C | |  | d. | 0°C and 100°C | |  | e. | 0°C and 373°C |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 12. On a summer day, the temperature may exceed 100°F. Correctly estimating this temperature in Celsius yields:   |  |  |  | | --- | --- | --- | |  | a. | 122°C. | |  | b. | 8.0°C. | |  | c. | 38°C. | |  | d. | 56°C. | |  | e. | 34°C. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 13. Lead melts at 328°C. Correctly estimating this temperature in Fahrenheit yields:   |  |  |  | | --- | --- | --- | |  | a. | 201°F. | |  | b. | 622°F. | |  | c. | 533°F. | |  | d. | 182°F. | |  | e. | 150°F. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 14. Helium may be liquified at -452°F. Correctly estimating this temperature in Celsius yields:   |  |  |  | | --- | --- | --- | |  | a. | -219°C. | |  | b. | -484°C. | |  | c. | -82°C. | |  | d. | -269°C. | |  | e. | -871°C. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 15. Which of the following is not a physical property?   |  |  |  | | --- | --- | --- | |  | a. | reactivity | |  | b. | pressure | |  | c. | hardness | |  | d. | temperature | |  | e. | heat capacity |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts | |

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| 16. All of the following properties of a substance can aid in its identification except:   |  |  |  | | --- | --- | --- | |  | a. | temperature. | |  | b. | reactivity. | |  | c. | melting point. | |  | d. | boiling point. | |  | e. | density. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Predict consequences | |

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| 17. What is the volume of 84.9 g of nickel? (Density of nickel = 8.90 g/mL)   |  |  |  | | --- | --- | --- | |  | a. | 76.0 mL | |  | b. | 8.54 mL | |  | c. | 9.54 mL | |  | d. | 756 mL | |  | e. | 0.105 mL |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Application | | *NOTES:* | Solve problems using reequired skills or knowledge | |

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| 18. An 8.90 g sample of nickel occupies 1 mL. Which statment is true?   |  |  |  | | --- | --- | --- | |  | a. | The density of a 17.80 g sample of nickel would be twice that of the 8.90 g sample. | |  | b. | The density of a 4.45 g sample of nickel would be half that of the 8.90 g sample. | |  | c. | The density of a 2 mL sample would be the same as the 1 mL sample. | |  | d. | The density of a 2 mL sample would be twice that of the 1 mL sample. | |  | e. | The density of a 2 mL sample would be half that of the 1 mL sample. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 19. A sample has a mass of 165 g and a volume of 61.1 cm3. What is a possible identity of the sample?   |  |  |  | | --- | --- | --- | |  | a. | aluminum (density = 2.70 g/cm3) | |  | b. | copper (density = 8.92 g/cm3) | |  | c. | silver (density = 10.5 g/cm3) | |  | d. | iron (density = 7.86 g/cm3) | |  | e. | mercury (density = 13.6 g/cm3) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Syntheis | | *NOTES:* | Generalize from given facts | |

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| 20. A sample has a mass of 612 g and a volume of 78 cm3. What is the identity of the sample?   |  |  |  | | --- | --- | --- | |  | a. | iron (density = 7.86 g/cm3) | |  | b. | copper (density = 8.92 g/cm3) | |  | c. | aluminum (density = 2.7 g/cm3) | |  | d. | mercury (density = 13.6 g/cm3) | |  | e. | silver (density = 10.5 g/cm3) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Synthesis | | *NOTES:* | Generalize from given facts | |

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| 21. If 225 mL of water at 25°C is frozen at 0.0°C, what volume of ice is created? (Density of water at 25°C = 0.997 g/mL; density of ice at 0.0°C = 0.917 g/mL)   |  |  |  | | --- | --- | --- | |  | a. | 224 mL | |  | b. | 225 mL | |  | c. | 226 mL | |  | d. | 207 mL | |  | e. | 245 mL |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Syntheis | | *NOTES:* | Relate knowledge from several areas | |

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| 22. Which of the following is not a physical property of water?   |  |  |  | | --- | --- | --- | |  | a. | Water can be broken down into hydrogen gas and oxygen gas. | |  | b. | Water is a liquid at room temperature. | |  | c. | Water freezes at 32°F. | |  | d. | Water boils at 100°C. | |  | e. | Water is transparent to visible light. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Knowldege | | *NOTES:* | Observation and recall of information | |

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| 23. Which of the following does not describe a physical property?   |  |  |  | | --- | --- | --- | |  | a. | A lead brick sinks in water. | |  | b. | Aluminum melts at 660°C. | |  | c. | Paper burns to ash. | |  | d. | Table sugar often appears as granulated powder. | |  | e. | Elemental sulfur appears yellow in color. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.4 Identifying Matter: Physical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 24. Which metric prefix means 1 × 10-6?   |  |  |  | | --- | --- | --- | |  | a. | milli | |  | b. | kilo | |  | c. | pico | |  | d. | micro | |  | e. | nano |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 25. Which metric prefix means 1 × 10−9?   |  |  |  | | --- | --- | --- | |  | a. | milli | |  | b. | pico | |  | c. | kilo | |  | d. | micro | |  | e. | nano |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 26. There are \_\_\_\_\_ milligrams in a kilogram.   |  |  |  | | --- | --- | --- | |  | a. | 1 × 10−3 | |  | b. | 1 × 106 | |  | c. | 1 × 10−6 | |  | d. | 1 × 103 | |  | e. | 1 × 109 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 27. There are \_\_\_\_\_ centimeters in a nanometer.   |  |  |  | | --- | --- | --- | |  | a. | 1 × 10−9 | |  | b. | 1 × 10-3 | |  | c. | 1 × 10-5 | |  | d. | 1 × 10−7 | |  | e. | 1 × 105 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 28. How many significant figures are present in each of the following: 86.9, 3.710, and 0.0492?   |  |  |  | | --- | --- | --- | |  | a. | three, four, three | |  | b. | three, three, four | |  | c. | three, four, four | |  | d. | three, three, three | |  | e. | three, four, five |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Application | | *NOTES:* | Use methods, concepts in new situations | |

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| 29. What is the proper answer and number of significant figures for the following calculation: 2.80 × 4.2?   |  |  |  | | --- | --- | --- | |  | a. | 11.7 | |  | b. | 1.2 × 101 | |  | c. | 12.0 | |  | d. | 11.76 | |  | e. | None of these choices |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Application | | *NOTES:* | Use methods, concepts in new situations | |

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| 30. What is the proper answer and number of significant figures for the following calculation: (28.914 - 19.3) × 8.152?   |  |  |  | | --- | --- | --- | |  | a. | 78.37 | |  | b. | 80 | |  | c. | 78.4 | |  | d. | 78.373 | |  | e. | 78 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.5 Measurements, Units, and Calculations | | *OTHER:* | Application | | *NOTES:* | Use methods, concepts in new situations | |

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| 31. Which of the following is a chemical property of iron?   |  |  |  | | --- | --- | --- | |  | a. | Iron melts at 1535°C. | |  | b. | Iron rusts on exposure to water and oxygen. | |  | c. | Iron can be bent into shapes. | |  | d. | Iron conducts electricity. | |  | e. | Iron conducts heat. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.6 Chemical Change and Chemical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 32. Which of the following is not a chemical property of water?   |  |  |  | | --- | --- | --- | |  | a. | Water and carbon dioxide are produced by the combustion of fossil fuels. | |  | b. | Water boils at 100 degrees Celsius. | |  | c. | Water combines with sulfur dioxide and oxygen to produce sulfuric acid. | |  | d. | Water interacts with some metals to produce hydrogen gas. | |  | e. | Water combines with carbon dioxide in plants to produce starches and sugars. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.6 Chemical Change and Chemical Properties | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 33. Which of the following describes a chemical change?   |  |  |  | | --- | --- | --- | |  | a. | Ethanol evaporates quickly at room temperature. | |  | b. | Ethanol has a high heat capacity. | |  | c. | Ethanol can be produced by the fermentation of grapes. | |  | d. | Ethanol boils when heated. | |  | e. | Ethanol is a clear, colorless liquid. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.6 Chemical Change and Chemical Properties | | *OTHER:* | Evaluation | | *NOTES:* | Compare and discriminate between ideas | |

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| 34. Which of the following describes a chemical change?   |  |  |  | | --- | --- | --- | |  | a. | grinding coffee beans | |  | b. | boiling water | |  | c. | fermenting wine | |  | d. | crushing an aluminum can | |  | e. | bending copper wire |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.6 Chemical Change and Chemical Properties | | *OTHER:* | Evaluation | | *NOTES:* | Compare and discriminate between ideas | |

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| 35. Which of the following substances is homogeneous?   |  |  |  | | --- | --- | --- | |  | a. | vegetable soup | |  | b. | wood | |  | c. | salt dissolved in water | |  | d. | a mirror | |  | e. | a jelly bean |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Evaluation | | *NOTES:* | Compare and discriminate between ideas | |

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| 36. Which of the following is heterogeneous?   |  |  |  | | --- | --- | --- | |  | a. | a tossed salad | |  | b. | a clear sugar solution | |  | c. | grape juice | |  | d. | copper pipe | |  | e. | black coffee |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Evaluation | | *NOTES:* | Compare and discriminate between ideas | |

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| 37. Sugar, coffee, and bismuth are:   |  |  |  | | --- | --- | --- | |  | a. | a pure substance, a heterogeneous mixture, and an element. | |  | b. | an element, a homogeneous mixture, and a pure substance. | |  | c. | a homogeneous mixture, a pure substance, and a homogeneous mixture. | |  | d. | an element, a pure substance, and a homogeneous mixture. | |  | e. | none of these choices. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Evaluation | | *NOTES:* | Compare and discriminate between ideas | |

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| 38. Which of the following would not convert a heterogeneous mixture into a more homogeneous material?   |  |  |  | | --- | --- | --- | |  | a. | magnetically removing iron from an iron-sulfur mixture | |  | b. | picking rice grains from a mixture of rice and peas | |  | c. | filtering sand away from water | |  | d. | filtering a salt solution | |  | e. | doing chromatography on an ink sample |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Synthesis | | *NOTES:* | Predict, draw conclusons | |

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| 39. Which is the best definition of a pure substance?   |  |  |  | | --- | --- | --- | |  | a. | A material whose properties cannot be changed by further physical separation | |  | b. | A material that contains two or more types of atoms | |  | c. | A material that has been heated | |  | d. | A material whose properties have been measured | |  | e. | A material in the gas phase |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 40. Which of the following is not a solution?   |  |  |  | | --- | --- | --- | |  | a. | air | |  | b. | alcohol in water | |  | c. | ice in water | |  | d. | red wine | |  | e. | brass |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Substances and Mixtures | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts, compare | |

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| 41. Which of the following will not have a specific composition and specific properties?   |  |  |  | | --- | --- | --- | |  | a. | steel | |  | b. | aspirin | |  | c. | ammonia | |  | d. | water | |  | e. | ozone |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.7 Classifying Matter: Elements and Compounds | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts, compare | |

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| 42. A pure solid reacts with air to produce a new white solid. What can be concluded about the original solid?   |  |  |  | | --- | --- | --- | |  | a. | it must be an element | |  | b. | it might be an element | |  | c. | it must be a compound | |  | d. | it might be a compound | |  | e. | it could be either an element or a compound |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.8 Classifying Matter: Elements and Compounds | | *OTHER:* | Evaluation | | *NOTES:* | Make choices based on reasoned argument | |

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| 43. Which choice would represent a compound?   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.8 Classifying Matter: Elements and Compounds | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts, compare | |

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| 44. What does the drawing best represent?   |  |  |  | | --- | --- | --- | |  | a. | A pure element | |  | b. | A heterogenous mixture | |  | c. | A homogeneous mixture | |  | d. | A pure compound | |  | e. | A mixture of gases |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.8 Classifying Matter: Elements and Compounds | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts, compare | |

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| 45. What does the drawing best represent?   |  |  |  | | --- | --- | --- | |  | a. | A pure element | |  | b. | A heterogenous mixture | |  | c. | A homogeneous mixture | |  | d. | A pure compound | |  | e. | A mixture of gases |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.8 Classifying Matter: Elements and Compounds | | *OTHER:* | Comprehension | | *NOTES:* | Interpret facts, compare | |

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| 46. Bacteria, sugar molecules, and water droplets are matter at the:   |  |  |  | | --- | --- | --- | |  | a. | microscale, nanoscale, macroscale. | |  | b. | macroscale, nanoscale, microscale. | |  | c. | microscale, macroscale, nanoscale. | |  | d. | nanoscale, microscale, macroscale. | |  | e. | none of these choices. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Comprehension | | *NOTES:* | Grasp meaning | |

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| 47. Three length scales ordered from smallest to largest are:   |  |  |  | | --- | --- | --- | |  | a. | microscale, macroscale, nanoscale. | |  | b. | macroscale, nanoscale, microscale. | |  | c. | microscale, nanoscale, macroscale. | |  | d. | nanoscale, microscale, macroscale. | |  | e. | none of these choices. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Analysis | | *NOTES:* | Organization of parts | |

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| 48. Which characteristic below best fits the description of a solid?   |  |  |  | | --- | --- | --- | |  | a. | large distances between the molecules | |  | b. | molecules that are close together but are moving past one another | |  | c. | rapid molecular motion | |  | d. | highly disordered molecules | |  | e. | highly ordered molecules |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 49. Which characteristic below best fits the description of a liquid?   |  |  |  | | --- | --- | --- | |  | a. | large distances between the molecules | |  | b. | rapid molecular motion | |  | c. | highly ordered molecules | |  | d. | molecules that are close together but are moving past one another | |  | e. | highly disordered molecules |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 50. According to the Kinetic Molecular Theory, as the temperature of a compound increases:   |  |  |  | | --- | --- | --- | |  | a. | it freezes | |  | b. | its boiling point increases | |  | c. | its molecular motion increases | |  | d. | its melting point increases | |  | e. | all of these choices |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 51. Which of the following does not occur when ice melts?   |  |  |  | | --- | --- | --- | |  | a. | The arrangement of molecules changes. | |  | b. | The speed of the molecules changes. | |  | c. | Its density changes. | |  | d. | Its molecular composition changes. | |  | e. | Its shape changes. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Comprehension | | *NOTES:* | Predict consequences | |

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| 52. Which characteristics apply to the gaseous state?   |  |  | | --- | --- | | I. | low density | | II. | high density | | III. | rapid molecular motion | | IV. | slow molecular motion | | V. | large distance between particles |  |  |  |  | | --- | --- | --- | |  | a. | II, V | |  | b. | I, IV, V | |  | c. | II, III, V | |  | d. | I, V | |  | e. | I, III, V |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 53. Which substance is most highly compressible?   |  |  |  | | --- | --- | --- | |  | a. | aluminum | |  | b. | air | |  | c. | alcohol | |  | d. | wood | |  | e. | water |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Analysis | | *NOTES:* | Recognition of hidden meanings | |

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| 54. Which choice contains phases of matter that have no definite shape:   |  |  |  | | --- | --- | --- | |  | a. | liquid and gas | |  | b. | liquid | |  | c. | solid | |  | d. | gas | |  | e. | all of these choices |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.9 Nanoscale Theories and Models | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 55. Which of the following is not part of modern atomic theory?   |  |  |  | | --- | --- | --- | |  | a. | A chemical reaction involves joining, separating, or rearranging atoms. | |  | b. | Compounds are formed by the chemical combination of two or more different kinds of atoms. | |  | c. | Atoms of a given element have the same chemical properties. | |  | d. | All matter is made up of atoms. | |  | e. | Atoms are indestructible. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 56. Which of the following is not part of Dalton's Atomic Theory?   |  |  |  | | --- | --- | --- | |  | a. | Atoms of a given element have the same mass. | |  | b. | An atom of one element can be chemically transformed into a different type of atom. | |  | c. | Atoms of different elements combine in whole number quantities. | |  | d. | Atoms of different elements have different masses. | |  | e. | Matter is not created nor destroyed in a chemical reaction; the molecular arrangements are changed. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 57. In a chemical reaction, 36 g of water is broken down to yield 32 g of oxygen gas and 4 g of hydrogen gas. This is an example of:   |  |  |  | | --- | --- | --- | |  | a. | The Law of Conservation of Energy. | |  | b. | Dalton's Atomic Theory. | |  | c. | The Law of Constant Composition. | |  | d. | The Law of Multiple Proportion. | |  | e. | The Law of Conservation of Mass. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Comprehension | | *NOTES:* | Translate knowledge into new context | |

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| 58. In a chemical reaction, 23.2 g of mercury oxide is broken down to yield 20 g of mercury and 3.2 g of oxygen gas. This is an example of:   |  |  |  | | --- | --- | --- | |  | a. | The Law of Multiple Proportion. | |  | b. | Dalton's Atomic Theory. | |  | c. | The Law of Constant Composition. | |  | d. | The Law of Conservation of Energy. | |  | e. | The Law of Conservation of Mass. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Comprehension | | *NOTES:* | Translate knowledge into new context | |

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| 59. Carbon dioxide is always composed of three parts by weight of carbon and eight parts by weight of oxygen. This is an example of:   |  |  |  | | --- | --- | --- | |  | a. | Dalton's Atomic Theory. | |  | b. | The Law of Multiple Proportion. | |  | c. | The Law of Constant Composition. | |  | d. | The Law of Conservation of Energy. | |  | e. | The Law of Conservation of Mass. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Comprehension | | *NOTES:* | Translate knowledge into new context | |

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| 60. Sulfur dioxide is always composed of one part by weight of sulfur and one part by weight of oxygen. This is an example of:   |  |  |  | | --- | --- | --- | |  | a. | The Law of Conservation of Mass. | |  | b. | The Law of Multiple Proportion. | |  | c. | Dalton's Atomic Theory. | |  | d. | The Law of Constant Composition. | |  | e. | The Law of Conservation of Energy. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Comprehension | | *NOTES:* | Translate knowledge into new context | |

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| 61. Combining two hydrogen atoms with one oxygen atom yields water while combining two hydrogen atoms with two oxygen atoms yields hydrogen peroxide. This is an example of:   |  |  |  | | --- | --- | --- | |  | a. | The Law of Conservation of Mass. | |  | b. | The Law of Multiple Proportion. | |  | c. | The Law of Constant Composition. | |  | d. | The Law of Conservation of Energy. | |  | e. | Dalton's Atomic Theory. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.10 The Atomic Theory | | *OTHER:* | Comprehension | | *NOTES:* | Translate knowledge into new context | |

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| 62. Water droplets, water molecules, and H2O are water at the following levels:   |  |  |  | | --- | --- | --- | |  | a. | macroscale, nanoscale, symbolic. | |  | b. | nanoscale, symbolic, macroscale. | |  | c. | nanoscale, macroscale, symbolic. | |  | d. | symbolic, nanoscale, macroscale. | |  | e. | macroscale, symbolic, nanoscale. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.11 Communicating Chemistry: Symbolism | | *OTHER:* | Analysis | | *NOTES:* | Identification of components | |

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| 63. How many of each types of atoms does the compound Al2(SO4)3 contain?   |  |  |  | | --- | --- | --- | |  | a. | 2 aluminum, 3 sulfur and 4 oxygen | |  | b. | 2 aluminum, 3 sulfur and 12 oxygen | |  | c. | 2 aluminum, 1 sulfur and 4 oxygen | |  | d. | 2 aluminum, 2 sulfur and 4 oxygen | |  | e. | 2 aluminum, 1 sulfur and 12 oxygen |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.11 Communicating Chemistry: Symbolism | | *OTHER:* | Application | | *NOTES:* | Solve problems using required skills or knowledge | |

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| 64. How many of each types of atoms does the compound mercury acetate, Hg2(C2H3O2)2 contain?   |  |  |  | | --- | --- | --- | |  | a. | 1 mercury, 2 carbon, 3 hydrogen, 2 oxygen | |  | b. | 4 mercury, 4 carbon, 6 hydrogen, 4 oxygen | |  | c. | 2 mercury, 2 carbon, 3 hydrogen, 2 oxygen | |  | d. | 2 mercury, 4 carbon, 6 hydrogen, 4 oxygen | |  | e. | 2 mercury, 2 carbon, 3 hydrogen, 4 oxygen |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.11 Communicating Chemistry: Symbolism | | *OTHER:* | Application | | *NOTES:* | Solve problems using required skills or knowledge | |

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| 65. Which of the following is not the symbol of an element?   |  |  |  | | --- | --- | --- | |  | a. | Cr | |  | b. | CO | |  | c. | Ca | |  | d. | C | |  | e. | Cd |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 66. Which of the following is not the symbol of an element?   |  |  |  | | --- | --- | --- | |  | a. | Kr | |  | b. | Rx | |  | c. | Fr | |  | d. | Os | |  | e. | At |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Knowledge | | *NOTES:* | Knowledge of major ideas | |

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| 67. Which of the following represents a pair of allotropes?   |  |  |  | | --- | --- | --- | |  | a. | glucose and sucrose | |  | b. | air and oxygen | |  | c. | sand and glass | |  | d. | graphite and diamond | |  | e. | carbon monoxide and carbon dioxide |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Analysis | | *NOTES:* | Recognition of hidden meanings | |

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| 68. Which of the following is not a metal?   |  |  |  | | --- | --- | --- | |  | a. | sulfur (S, atomic number 16) | |  | b. | lithium (Li, atomic number 3) | |  | c. | uranium (U, atomic number 92) | |  | d. | nickel (Ni, atomic number 28) | |  | e. | calcium (Ca, atomic number 20) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 69. Which of the following is a metal?   |  |  |  | | --- | --- | --- | |  | a. | selenium (Se, atomic number 34) | |  | b. | helium (He, atomic number 2) | |  | c. | sodium (Na, atomic number 11) | |  | d. | nitrogen (N, atomic number 7) | |  | e. | carbon (C, atomic number 6) |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 70. Which of the following is a metalloid?   |  |  |  | | --- | --- | --- | |  | a. | silicon (Si, atomic number 14) | |  | b. | chlorine (Cl, atomic number 17) | |  | c. | uranium (U, atomic number 92) | |  | d. | tungsten (W, atomic number 74) | |  | e. | hydrogen (H, atomic number 1) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *TOPICS:* | 1.12 The Chemical Elements | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 71. Which element can be classified as a lanthanide?   |  |  |  | | --- | --- | --- | |  | a. | Tl | |  | b. | Th | |  | c. | Tb | |  | d. | Tc | |  | e. | Ti |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 72. Which element can be classified as a halogen?   |  |  |  | | --- | --- | --- | |  | a. | He | |  | b. | O | |  | c. | Cl | |  | d. | H | |  | e. | La |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 73. Which element can be classified as a noble gas?   |  |  |  | | --- | --- | --- | |  | a. | Cl | |  | b. | S | |  | c. | Ne | |  | d. | P | |  | e. | No |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 74. Which element can be classified as a transition metal?   |  |  |  | | --- | --- | --- | |  | a. | N | |  | b. | Rb | |  | c. | F | |  | d. | Ar | |  | e. | Co |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 75. Which element can be classified as an alkali metal?   |  |  |  | | --- | --- | --- | |  | a. | Al | |  | b. | Na | |  | c. | U | |  | d. | Sr | |  | e. | Ag |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Knowledge | | *NOTES:* | Observation and recall of information | |

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| 76. Which element is highly reactive?   |  |  |  | | --- | --- | --- | |  | a. | Cu | |  | b. | Kr | |  | c. | Al | |  | d. | K | |  | e. | C |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns, recognition of hidden meanings | |

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| 77. Which element is the least reactive and is found uncombined in nature?   |  |  |  | | --- | --- | --- | |  | a. | Cu | |  | b. | Ne | |  | c. | N | |  | d. | Fe | |  | e. | Au |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns, recognition of hidden meanings | |

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| 78. Three elements that are likely to have similar chemical and physical properties are:   |  |  |  | | --- | --- | --- | |  | a. | Pb, Bi, Po | |  | b. | B, C, Si | |  | c. | Cu, Ag, Au | |  | d. | Ca, Co, Cr | |  | e. | H, He, Ne |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *TOPICS:* | 1.13 The Periodic Table | | *OTHER:* | Analysis | | *NOTES:* | Seeing patterns | |

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| 79. A mixture that is nonuniform in composition is a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_ mixture.   |  |  | | --- | --- | | *ANSWER:* | heterogeneous | | *POINTS:* | 1 | |

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| 80. Melting point, thermal conductivity, and density are all examples of \_\_\_\_\_\_\_\_\_\_\_\_\_ properties.   |  |  | | --- | --- | | *ANSWER:* | physical | | *POINTS:* | 1 | |

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| 81. Ethanol contains 2 carbons, 6 hydrogens, 1 oxygen. Write its chemical formula.   |  |  | | --- | --- | | *ANSWER:* | C2H6O | | *POINTS:* | 1 | |

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| 82. Hydrogen peroxide contains 2 hydrogens and 2 oxygens. Write its chemical formula.   |  |  | | --- | --- | | *ANSWER:* | H2O2 | | *POINTS:* | 1 | |

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| 83. An element which has some properties of metals and some properties of nonmetals is called a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | metalloid | | *POINTS:* | 1 | |

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| 84. Burning of hydrogen fuel is a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_ change.   |  |  | | --- | --- | | *ANSWER:* | chemical | | *POINTS:* | 1 | |

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| 85. Filtering impurities out of water is a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_ process.   |  |  | | --- | --- | | *ANSWER:* | physical | | *POINTS:* | 1 | |

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| 86. Color is a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_ property.   |  |  | | --- | --- | | *ANSWER:* | physical | | *POINTS:* | 1 | |

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| 87. The ability to conduct electricity is a(an) \_\_\_\_\_\_\_\_\_\_\_\_\_ property.   |  |  | | --- | --- | | *ANSWER:* | physical | | *POINTS:* | 1 | |

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| 88. \_\_\_\_\_\_\_\_\_\_\_\_\_ is defined as the capacity to do work.   |  |  | | --- | --- | | *ANSWER:* | Energy | | *POINTS:* | 1 | |

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| 89. How many atoms are in a diatomic molecule?   |  |  | | --- | --- | | *ANSWER:* | two | | *POINTS:* | 1 | |

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| 90. Oxygen (O2) and ozone (O3) are \_\_\_\_\_\_\_\_\_\_\_\_\_ of the same element.   |  |  | | --- | --- | | *ANSWER:* | allotropes | | *POINTS:* | 1 | |

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| 91. Which state of matter is characterized by a variable shape but not volume?   |  |  | | --- | --- | | *ANSWER:* | liquid | | *POINTS:* | 1 | |

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| 92. The metric prefix \_\_\_\_\_\_\_\_\_\_\_\_\_ means one millionth.   |  |  | | --- | --- | | *ANSWER:* | micro | | *POINTS:* | 1 | |

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| 93. There are \_\_\_\_\_\_\_\_\_\_\_\_\_ milligrams in a nanogram.   |  |  | | --- | --- | | *ANSWER:* | 1 × 10-6 | | *POINTS:* | 1 | |

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| 94. Give an example of a Alkali Metal.   |  |  | | --- | --- | | *ANSWER:* | Li, Na, K, Rb, Cs, Fr | | *POINTS:* | 1 | |

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| 95. Give an example of a Alkaline Earth Metal.   |  |  | | --- | --- | | *ANSWER:* | Be, Mg, Ca, Sr, Ba, Ra | | *POINTS:* | 1 | |

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| ***Match the following:***   |  |  | | --- | --- | | a. | density | | b. | CH4, C2H6, C3H8 | | c. | possible explanation of observations | | d. | capacity to do work | | e. | melting | | f. | building blocks of matter | | g. | decomposition | | h. | scientific method | | i. | Cl2, Br2, O2 | | j. | fixed shape and volume | | k. | graphite, diamond | | l. | salt water | | m. | study of matter | |

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| 96. solid   |  |  | | --- | --- | | *ANSWER:* | j | | *POINTS:* | 1 | |

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| 97. hypothesis   |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | |

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| 98. diatomic molecules   |  |  | | --- | --- | | *ANSWER:* | i | | *POINTS:* | 1 | |

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| 99. atoms   |  |  | | --- | --- | | *ANSWER:* | f | | *POINTS:* | 1 | |

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| 100. chemistry   |  |  | | --- | --- | | *ANSWER:* | m | | *POINTS:* | 1 | |

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| 101. physical property   |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | |

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| 102. allotropes   |  |  | | --- | --- | | *ANSWER:* | k | | *POINTS:* | 1 | |

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| 103. chemical change   |  |  | | --- | --- | | *ANSWER:* | g | | *POINTS:* | 1 | |

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| 104. energy   |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | |

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| 105. solution   |  |  | | --- | --- | | *ANSWER:* | l | | *POINTS:* | 1 | |