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| 1. A hypothesis is a \_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | concise statement of behavior that is always the same under the same conditions |
|   | b.  | set of quantitative data |
|   | c.  | tentative explanation or predication based upon experimental observations |
|   | d.  | well-tested unifying principle that explains a body of facts |
|   | e.  | mathematical formula that models a pattern of behavior |

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| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.1 Chemistry and Its Methods |
| *NOTES:* | Dynamic Question |
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| 2. Which of the following statements concerning green chemistry is not correct?

|  |  |  |
| --- | --- | --- |
|   | a.  | It is better to prevent waste than to treat or clean up waste after it is formed. |
|   | b.  | Synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health or the environment. |
|   | c.  | Substances used in a chemical process should pose minimal risk for accidents. |
|   | d.  | Raw materials should be renewable whenever technically and economically practical. |
|   | e.  | Chemical syntheses should be done at extremely high temperatures to ensure harmful bacteria are destroyed. |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.2 Sustainability and Green Chemistry |
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| 3. One of the following is not a description of gases. Which one is it?

|  |  |  |
| --- | --- | --- |
|   | a.  | easily compressed |
|   | b.  | definite shape |
|   | c.  | relatively low densities |
|   | d.  | particles far apart |
|   | e.  | expands infinitely on heating |

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| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.3 Classifying Matter |
| *NOTES:* | Dynamic Question |
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| 4. Which of the following statements concerning the kinetic-molecular theory of matter is/are CORRECT?

|  |  |  |
| --- | --- | --- |
|   | 1. | Particles in a liquid vibrate back and forth about an average position. |
|   | 2. | Particles in a solid are packed closely together, but are not confined to specific positions. |
|   | 3. | Particles in a gas fly about randomly, colliding with themselves and the walls of their container. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 | e.  | 1, 2, and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.3 Classifying Matter |
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| 5. Which of the following statements concerning the kinetic-molecular theory of matter is/are correct?

|  |  |  |
| --- | --- | --- |
|   | 1. | Particles in a gas move faster as the temperature increases. |
|   | 2. | Particles in a liquid are packed closely together, but are not confined to specific positions. |
|   | 3. | Particles in a gas vibrate back and forth about their average position. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.3 Classifying Matter |
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| Instructions: Use the pictures below to answer question 6:A) B) C)D) E)  |

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| 6. Which of the above figures represents a liquid compound?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | Figure A | b.  | Figure B | c.  | Figure C | d.  | Figure D | e.  | Figure E |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *PREFACE NAME:* | Matching 1 |
| *TOPICS:* | 1.3 Classifying Matter1.4 Elements1.5 Compounds |
| *NOTES:* | OWL | Dynamic Question |
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| Instructions: Use the figures below to answer questions 7:**A)B)** **C)****D)** **E)** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 7. Which of the above figures represents a homogeneous mixture?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | Figure E | b.  | Figure A | c.  | Figure B | d.  | Figure C |
|   | e.  | Figure D |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *PREFACE NAME:* | Matching 2 |
| *TOPICS:* | 1.3 Classifying Matter1.4 Elements1.5 Compounds |
| *NOTES:* | OWL | Dynamic Question |
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| Instructions: Use the pictures below to answer question 8:A) B) C)D) E)  |

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| 8. Which of the above figure represents a mixture of two elements?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | Figure A | b.  | Figure B | c.  | Figure C | d.  | Figure D | e.  | Figure E |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Matching 3 |
| *TOPICS:* | 1.3 Classifying Matter1.4 Elements1.5 Compounds |
| *NOTES:* | OWL |
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| 9. Which one of the following statements is correct?

|  |  |  |
| --- | --- | --- |
|   | a.  | A pure substance may be separated by filtration or distillation into two or more components. |
|   | b.  | A heterogeneous mixture is also known as a solution. |
|   | c.  | A heterogeneous mixture is composed of two or more substances in the same phase. |
|   | d.  | The composition is uniform throughout a homogeneous mixture. |
|   | e.  | The combination of a liquid and a solid always results in a heterogeneous mixture. |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.3 Classifying Matter |
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| 10. Which of the following is not a mixture?

|  |  |  |
| --- | --- | --- |
|   | a.  | sea shells |
|   | b.  | ice cream |
|   | c.  | gasoline |
|   | d.  | wine |
|   | e.  | diamond |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.3 Classifying Matter |
| *NOTES:* | Dynamic Question |
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| 11. Which of the following are likely to form a homogeneous mixture?

|  |  |  |
| --- | --- | --- |
|   | 1. | milk and ice cream blended together with chocolate syrup |
|   | 2. | an egg combined with milk and mixed with a whisk |
|   | 3. | 1 gram table salt combined with 250 mL of water |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 | e.  | 1, 2, and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.3 Classifying Matter |
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| 12. Which one of the following is most likely to be a homogeneous mixture?

|  |  |  |
| --- | --- | --- |
|   | a.  | soil |
|   | b.  | blood |
|   | c.  | gasoline |
|   | d.  | mortar (a mixture of calcium carbonate and sand) |
|   | e.  | plain yogurt |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.3 Classifying Matter |
| *NOTES:* | Dynamic Question |
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| 13. Which of the following is a heterogeneous mixture?

|  |  |  |
| --- | --- | --- |
|   | a.  | Antifreeze (a mixture of water and ethylene glycol) |
|   | b.  | Blood |
|   | c.  | Sugar water |
|   | d.  | Gasoline |
|   | e.  | Vinegar (a mixture of acetic acid and water) |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.3 Classifying Matter |
| *NOTES:* | Dynamic Question |
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| 14. Which of the following statements is/are correct?

|  |  |  |
| --- | --- | --- |
|   | 1. | Atoms are the smallest particles of an element; they retain the element's chemical properties. |
|   | 2. | Substances composed of only one type of atom are classified as elements. |
|   | 3. | Out of 118 known elements, only 48 elements occur naturally. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 15. A number of the heaviest elements on the periodic table are named for famous scientists. Element number 101 was most likely named for which famous scientist?

|  |  |  |
| --- | --- | --- |
|   | a.  | Alfred Nobel |
|   | b.  | Nicolaus Copernicus |
|   | c.  | Glen Seaborg |
|   | d.  | Dmitri Mendeleev |
|   | e.  | Marie Curie |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.4 ElementsA Closer Look |
| *NOTES:* | Dynamic Question |
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| 16. What is the symbol for the element iron?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | Fe | b.  | Kr | c.  | Kr | d.  | Kr | e.  | Kr |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.4 Elements |
| *NOTES:* | Dynamic Question |
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| 17. What is the correct symbol for potassium?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | P | b.  | Pm | c.  | K | d.  | Pt | e.  | Po |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 18. What is the correct symbol for silver?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | S | b.  | Si | c.  | Ag | d.  | Sr | e.  | Au |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 19. The element whose symbol is Sn is

|  |  |  |
| --- | --- | --- |
|   | a.  | tin. |
|   | b.  | calcium. |
|   | c.  | calcium. |
|   | d.  | calcium. |
|   | e.  | none of these. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.4 Elements |
| *NOTES:* | Dynamic Question |
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| 20. What is the name of the element with the symbol B?

|  |  |  |
| --- | --- | --- |
|   | a.  | barium |
|   | b.  | beryllium |
|   | c.  | bismuth |
|   | d.  | boron |
|   | e.  | bromine |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 21. What is the name of the element with the symbol Cr?

|  |  |  |
| --- | --- | --- |
|   | a.  | cerium |
|   | b.  | carbon |
|   | c.  | chromium |
|   | d.  | cadmium |
|   | e.  | chlorine |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 22. Which one of the following substances is classified as a molecular element?

|  |  |  |
| --- | --- | --- |
|   | a.  | I2 |
|   | b.  | NO |
|   | c.  | KCl |
|   | d.  | C6H12O6 |
|   | e.  | CO |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 23. Which of the following is not a correct name–symbol combination?​

|  |  |  |
| --- | --- | --- |
|   | a.  | magnesium, Mg |
|   | b.  | nickel, Ni |
|   | c.  | phosphorus, P |
|   | d.  | krypton, Kr |
|   | e.  | potassium, Co |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.4 Elements |
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| 24. An electrically charged atom or group of atoms is a(n) \_\_\_\_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | element |
|   | b.  | ion |
|   | c.  | molecule |
|   | d.  | heterogeneous mixture |
|   | e.  | solution |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.5 Compounds |
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| 25. A pure substance composed of two or more different elements is a(n) \_\_\_\_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | ion |
|   | b.  | heterogeneous mixture |
|   | c.  | chemical compound |
|   | d.  | solid |
|   | e.  | solution |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.5 Compounds |
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| 26. A(n) \_\_\_\_\_\_\_\_ is a pure substance that is composed of only one type of atom.

|  |  |  |
| --- | --- | --- |
|   | a.  | ion |
|   | b.  | solution |
|   | c.  | element |
|   | d.  | molecule |
|   | e.  | gas |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.5 Compounds |
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| 27. Which one of the following substances is classified as a chemical compound?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | Ir | b.  | He | c.  | Ho | d.  | HI | e.  | In |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.5 Compounds |
| *NOTES:* | Dynamic Question |
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| 28. Which of the following terms best describes ammonia, NH3?

|  |  |  |
| --- | --- | --- |
|   | a.  | Homogeneous mixture |
|   | b.  | Ion |
|   | c.  | Element |
|   | d.  | Chemical compound |
|   | e.  | Atom |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.5 Compounds |
| *NOTES:* | Dynamic Question |
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| 29. Which of the following statements concerning water (H2O) is/are CORRECT?

|  |  |  |
| --- | --- | --- |
|   | 1. | H2O is a chemical compound. |
|   | 2. | Water is a homogeneous mixture. |
|   | 3. | Liquid water is a mixture of elemental hydrogen and oxygen. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 | e.  | 1, 2, and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.5 Compounds |
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| 30. Which one of the following statements is not a comparison of physical properties?

|  |  |  |
| --- | --- | --- |
|   | a.  | Potassium reacts with water more quickly than calcium reacts with water. |
|   | b.  | The electrical conductivity of aluminum is greater than copper. |
|   | c.  | The density of copper is less than the density of lead. |
|   | d.  | The solubility of NaCl in hot water is greater than the solubility in cold water. |
|   | e.  | The boiling point of water is greater than the boiling point of ethanol. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 31. Which of the following statements is/are CORRECT?

|  |  |  |
| --- | --- | --- |
|   | 1. | The conduction of electricity through copper wire is a chemical change. |
|   | 2. | The rusting of iron is a chemical change. |
|   | 3. | The evaporation of ammonia at -33.3 °C is a chemical change. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 2 and 3 | e.  | 1, 2, and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 32. Which one of the following statements is not a comparison of physical properties?

|  |  |  |
| --- | --- | --- |
|   | a.  | Mercury and gallium are both liquids at 50 °C. |
|   | b.  | Oxygen is more soluble in water than helium. |
|   | c.  | Silver and gold are malleable metals. |
|   | d.  | Oxygen and nitrogen are both liquids at -200 °C. |
|   | e.  | Calcium reacts more quickly than iron in acids. |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 33. An intensive property of a substance is

|  |  |  |
| --- | --- | --- |
|   | a.  | independent of the amount present. |
|   | b.  | dependent on its volume, but not its mass. |
|   | c.  | not affected by its temperature. |
|   | d.  | dependent only on its temperature. |
|   | e.  | dependent only on its mass and volume. |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 34. Which of the following are extensive properties: mass, volume, and/or density?

|  |  |  |
| --- | --- | --- |
|   | a.  | mass only |
|   | b.  | volume only |
|   | c.  | density only |
|   | d.  | mass and volume |
|   | e.  | volume and density |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 35. All of the following are examples of intensive properties of matter except \_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | boiling point |
|   | b.  | thermal conductivity |
|   | c.  | malleability |
|   | d.  | the amount of energy transferred as heat |
|   | e.  | color |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.6 Physical Properties |
| *NOTES:* | Dynamic Question |
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| 36. Which of following would be classified as a chemical change?

|  |  |  |
| --- | --- | --- |
|   | a.  | the transformation of solid carbon dioxide into gaseous carbon dioxide |
|   | b.  | the freezing of diesel fuel |
|   | c.  | the condensation of nitrogen gas |
|   | d.  | the removal of a color stain using bleach |
|   | e.  | the evaporation of water |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.7 Physical and Chemical Change |
| *NOTES:* | Dynamic Question |
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| 37. What kind of change is depicted below?

|  |  |  |
| --- | --- | --- |
|  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | a.  | no change | b.  | chemical change |
|   | c.  | both chemical and physical change | d.  | physical change |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 1.7 Physical and Chemical Change |
| *NOTES:* | OWL | Dynamic Question |
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| 38. Which of the following observations is/are examples of chemical change?

|  |  |  |
| --- | --- | --- |
|   | 1. | Iron (Fe) rusts, forming Fe2O3. |
|   | 2. | The density of water increases when it changes from a solid to a liquid. |
|   | 3. | Sodium chloride melts at 801 °C. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 | e.  | 2 and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.7 Physical and Chemical Change |
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| 39. Which of the following observations is/are examples of a physical change?

|  |  |  |
| --- | --- | --- |
|   | 1. | The density of water decreases when it solidifies. |
|   | 2. | Aluminum melts when heated above 660 °C. |
|   | 3. | Hydrogen peroxide (H2O2) decomposes to water and oxygen. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.7 Physical and Chemical Change |
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| 40. A battery-operated power tool, such as a cordless drill, converts

|  |  |  |
| --- | --- | --- |
|   | a.  | electrostatic energy to chemical potential energy. |
|   | b.  | mechanical energy to electrostatic energy. |
|   | c.  | thermal energy to mechanical energy. |
|   | d.  | thermal energy to gravitational energy. |
|   | e.  | chemical potential energy to mechanical energy. |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
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| 41. Which of the following lists contains only forms of kinetic energy?

|  |  |  |
| --- | --- | --- |
|   | a.  | electrostatic, gravitational, and mechanical energy |
|   | b.  | gravitational, mechanical, and electrical energy |
|   | c.  | thermal, acoustic, and mechanical energy |
|   | d.  | chemical, thermal, and acoustic energy |
|   | e.  | gravitational, chemical, and electrostatic energy |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
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| 42. Which of the following types of energy is/are classified as potential energy?

|  |  |  |
| --- | --- | --- |
|   | 1. | Thermal energy |
|   | 2. | Energy stored in a spring |
|   | 3. | Gravitational energy |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 2 and 3 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
| *NOTES:* | Dynamic Question |
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| 43. Substances like hydrogen (H2) and oxygen (O2) that are composed of only one type of atom are classified as \_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| *ANSWER:* | elements |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 44. Properties, such as color and density, which can be observed or measured without changing the composition of a substance are called \_\_\_\_\_\_\_\_ properties.

|  |  |
| --- | --- |
| *ANSWER:* | physical |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 45. A mass of 10 g of table salt dissolves in water to form a(n) \_\_\_\_\_\_\_\_ mixture (i.e., a mixture that is uniform throughout).

|  |  |
| --- | --- |
| *ANSWER:* | homogeneous |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.3 Classifying Matter |
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| 46. A(n) \_\_\_\_\_\_\_\_ is the smallest particle of an element that retains the characteristic chemical properties of that element.

|  |  |
| --- | --- |
| *ANSWER:* | atom |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.4 Elements |
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| 47. The \_\_\_\_\_\_\_\_ of a substance is defined as its mass per unit volume.

|  |  |
| --- | --- |
| *ANSWER:* | density |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 48. Density is an example of a(n) \_\_\_\_\_ property and does not depend on the amount of a substance.

|  |  |
| --- | --- |
| *ANSWER:* | intensive |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.6 Physical Properties |
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| 49. \_\_\_\_\_\_\_\_ energy is the energy associated with the separation of two electrical charges.

|  |  |
| --- | --- |
| *ANSWER:* | Electrostatic |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
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| 50. Potential energy possessed by water at the top of a waterfall is known as \_\_\_\_\_\_\_\_ energy.

|  |  |
| --- | --- |
| *ANSWER:* | gravitational |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
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| 51. The law of \_\_\_\_\_\_\_\_ states that the total energy of the universe is constant.

|  |  |
| --- | --- |
| *ANSWER:* | conservation of energy |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 5.1 Energy: Some Basic Principles |
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| 52. Many regulators, environmentalists, and citizens around the world believe that \_\_\_\_\_\_\_\_ *development* is required to meet today’s economic and environmental needs while preserving the options for future generations to meet theirs.

|  |  |
| --- | --- |
| *ANSWER:* | sustainable |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.2 Sustainability and Green Chemistry |
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| 53. To ensure integrity in science, experimental results should be \_\_\_\_\_\_\_\_ and reported in sufficient detail that the experiment can be repeated by others.

|  |  |
| --- | --- |
| *ANSWER:* | reproducible |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.1 Chemistry and Its Methods |
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| 54. Which of the following statements is true of a chemical equation?

|  |  |  |
| --- | --- | --- |
|   | a.  | It is a representation of only a physical change rather than a chemical or molecular change. |
|   | b.  | It shows that the reactants on the left side of an equation produce the products on the right side of the equation. |
|   | c.  | The number of atoms found in the reactants doubles in the products. |
|   | d.  | The number of atoms found in the reactants halves in the products. |
|   | e.  | The identity of the substance in a chemical equation is preserved. |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.7 Physical and Chemical Changes |
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| 55. Which of the following is an example of qualitative information about a substance?

|  |  |  |
| --- | --- | --- |
|   | a.  | Color of the substance |
|   | b.  | Melting temperature of the substance |
|   | c.  | Mass of the substance |
|   | d.  | Volume of the substance |
|   | e.  | Boiling temperature of the substance |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | 1.1 Chemistry and Its Methods |
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| 1. The SI base unit of length is the \_\_\_\_.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | newton | b.  | liter | c.  | meter | d.  | candela |
|   | e.  | Ångstrom unit |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 2. The SI unit of temperature is the \_\_\_\_.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | kelvin | b.  | calorie | c.  | Fahrenheit | d.  | Ångstrom | e.  | kilocalorie |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 3. Which of the following is not a base SI unit?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | meter | b.  | kelvin | c.  | calorie | d.  | second | e.  | mole |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 4. Which of the following statements about the SI system is/are correct?

|  |  |  |
| --- | --- | --- |
|   | 1. | Prefixes are used to indicate a power of ten multiplier for a given SI base unit of measurement. |
|   | 2. | Celsius degrees (°C) is the SI base unit for temperature. |
|   | 3. | The kilogram (kg) is the SI base unit for mass. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 3 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 5. Which of the following statements concerning the common temperature scales is/are true?

|  |  |  |
| --- | --- | --- |
|   | 1. | Fahrenheit is an absolute temperature scale. |
|   | 2. | The normal boiling point of water (100°C) is equal to 273 K. |
|   | 3. | The difference between the boiling point and freezing point of a substance is the same for the Celsius and Kelvin scales. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 2 and 3 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 6. Order the four metric units provided from smallest to largest.1) liter 2) centiliter 3) microliter 4) milliliter

|  |  |  |
| --- | --- | --- |
|   | a.  | liter < centiliter < milliliter < microliter |
|   | b.  | microliter < milliliter < centiliter < liter |
|   | c.  | milliliter < microliter < centiliter < liter |
|   | d.  | centiliter < microliter < liter < milliliter |
|   | e.  | liter < centiliter < microliter < milliliter |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 7. Which method is correct for converting kelvin to Celsius?

|  |  |  |
| --- | --- | --- |
|   | a.  |  |
|   | b.  |  |
|   | c.  |  |
|   | d.  |  |
|   | e.  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 8. The melting point of a solid is 39 °F. This corresponds to \_\_\_\_\_.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 295 K | b.  | 312 K | c.  | 286 K | d.  | 277 K |
|   | e.  | 312 K |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 9. A particular liquid boils at –374°F. What is its boiling point on the Kelvin scale?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 83 K | b.  | 65 K | c.  | 47 K | d.  | 97 K |
|   | e.  | 165 K |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 10. The melting point of a certain solid is –27°C. This corresponds to

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 9°F. | b.  | –33°F. | c.  | –17°F. | d.  | –106°F. |
|   | e.  | 17°F. |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11. The melting point of a particular solid is 2863 K. This corresponds to

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 4694°F. | b.  | 3136°C. | c.  | 2529°C. | d.  | 4630°F. |
|   | e.  | 1471°F. |  |  |  |  |  |  |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
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| 12. The boiling point of liquid argon is 87.3 K. What is the boiling point in Celsius degrees?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 189.1 °C | b.  | –185.9 °C | c.  | 87.3 °C | d.  | 360.5 °C |
|   | e.  | –210.7 °C |  |  |  |  |  |  |

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| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
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| 13. Which is the largest mass?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 10 dg | b.  | 10 ng | c.  | 10 mg | d.  | 10 pg | e.  | 10 cg |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
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| 14. Which of the following is the smallest mass?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.5 × 108 pg |
|   | b.  | 1.5 × 106 ng |
|   | c.  | 1.5 × 103 μg |
|   | d.  | 1.5 × 10–1 mg |
|   | e.  | 1.5 × 10–5 g |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 15. Which of the following is the largest volume?

|  |  |  |
| --- | --- | --- |
|   | a.  | 5.0 × 102 cm3 |
|   | b.  | 5.0 × 10–4 L |
|   | c.  | 5.0 × 103 mL |
|   | d.  | 5.0 × 10–1 L |
|   | e.  | 5.0 × 105 μL |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 16. In the area of nanotechnology, particles defined as nanoparticles range in size from 1 nm to 2500 nm. One nm is equivalent to 1 × 10–9 m. If the size of the particles that make up a particular material is 5.34 × 10–8 cm, what is this size in nanometers?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 53,400 nm | b.  | 5.34 nm | c.  | 0.534 nm | d.  | 5340 nm |
|   | e.  | 534 nm |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 17. The distance between atoms is sometimes given in picometers, where 1 pm is equivalent to 1 × 10–12 m. If the distance between the layers of atoms in a particular compound is given as 328 pm, what is the distance in cm?

|  |  |  |
| --- | --- | --- |
|   | a.  | 3.28 × 10–6 cm |
|   | b.  | 3.28 × 10–14 cm |
|   | c.  | 3.28 × 10–12 cm |
|   | d.  | 3.28 × 10–8 cm |
|   | e.  | 3.28 × 10–10 cm |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 18. One-thousandth of a microgram is

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 10–6 g. | b.  | 10–9 g. | c.  | 10–12 g. | d.  | 10–8 g. |
|   | e.  | 10–10 g. |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 19. The mass of 76 kg equals

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 760 g. | b.  | 7600 g. | c.  | 7.6 × 104 g. | d.  | 0.076 g. |
|   | e.  | 0.76 g. |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 20. The wavelength of light emitted from a particular red diode laser is 651 nm. What is the wavelength in meters?

|  |  |  |
| --- | --- | --- |
|   | a.  | 6.51 × 1011 m |
|   | b.  | 6.51 × 10–2 m |
|   | c.  | 6.51 × 10–4 m |
|   | d.  | 6.51 × 10–7 m |
|   | e.  | 6.51 × 10–9 m |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 21. Light with a wavelength of 1.5 × 10–8 m is in the X-ray region of the electromagnetic spectrum. What is the wavelength of this light in picometers (pm)?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.5 × 10–80 pm |
|   | b.  | 1.5 × 10–20 pm |
|   | c.  | 1.5 × 10–1 pm |
|   | d.  | 1.5 × 104 pm |
|   | e.  | 1.5 × 107 pm |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
| *DATE CREATED:* | 3/5/2014 6:41 PM |
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| 22. 7.2 seconds contain this many picoseconds.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 7.2 × 109 | b.  | 7.2 × 1012 | c.  | 7.2 × 10–9 | d.  | 7.2 × 10–12 |
|   | e.  | 7.2 × 1015 |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
| *DATE CREATED:* | 3/5/2014 6:41 PM |
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| 23. Which of the following volumes are equivalent to 75 L?

|  |  |  |
| --- | --- | --- |
|   | 1. | 75 cm3 |
|   | 2. | 7.5 × 104 mL |
|   | 3. | 0.0075 kL |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 | e.  | 1, 2, and 3 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 24. Express the volume 622.8 cm3 in liters.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 6.228 L | b.  | 0.06228 L | c.  | 0.6228 L | d.  | 62.28 L |
|   | e.  | 622.8 L |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.1 Units of Measurement |
| *NOTES:* | Dynamic Question |
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| 25. Which of the following statements is/are correct?

|  |  |  |
| --- | --- | --- |
|   | 1. | A joule is defined as the energy required to change the temperature of 1.00 g of water from 14.5 °C to 15.5 °C. |
|   | 2. | One calorie (cal) equals 4.184 J, where the joule (J) is the SI unit of energy. |
|   | 3. | A calorie (cal) is equal to 1000 dietary Calories (Cal). |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 3 only | d.  | 1 and 2 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 26. How many joules are equivalent to 450 calories?

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.45 J |
|   | b.  | 4.5 × 102 J |
|   | c.  | 9.3 × 10–3 J |
|   | d.  | 1.9 × 103 J |
|   | e.  | 4.5 × 105 J |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 27. How many nutritional calories are equivalent to 1150 kJ?

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.10 Cal |
|   | b.  | 1.15 Cal |
|   | c.  | 275 Cal |
|   | d.  | 4.8 × 103 Cal |
|   | e.  | 3.6 × 10-3 Cal |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
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| 28. The figure below depicts a shooting target. The black dots represent the shots fired by a shooter.Which of the following best describes the shooter’s results?

|  |  |  |
| --- | --- | --- |
|   | a.  | Accurate and precise. |
|   | b.  | Precise but not accurate. |
|   | c.  | Neither accurate nor precise. |
|   | d.  | Accurate but not precise. |
|   | e.  | None of the these. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
| *NOTES:* | Dynamic Question |
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| 29. Which of the following statements concerning accuracy and precision is/are correct?

|  |  |  |
| --- | --- | --- |
|   | 1. | It is possible for a series of measurements to be both precise and inaccurate. |
|   | 2. | Accuracy is a measure of how close multiple measurements are to each other. |
|   | 3. | The more the number of significant figures in a measurement, the more accurate the measurement. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 only | b.  | 2 only | c.  | 1 and 2 | d.  | 2 and 3 |
|   | e.  | 1, 2, and 3 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 30. Two electronic balances are tested using a standard weight. The true mass of the standard is 5.0000 g. The results of 5 individual measurements on each balance are recorded below.

|  |  |  |  |
| --- | --- | --- | --- |
|   |   | Balance A | Balance B |
|   |   | 5.2895 g | 5.0001 g |
|   |   | 5.1077 g | 4.9998 g |
|   |   | 4.6407 g | 4.9999 g |
|   |   | 4.8947 g | 5.0002 g |
|   |   | 5.0672 g | 4.9999 g |
|   | average mass = | 5.0000 g | 5.0000 g |

Which statement best describes the results?

|  |  |  |
| --- | --- | --- |
|   | a.  | A: poor precision, good accuracy. B: good precision, good accuracy. |
|   | b.  | A: good precision, good accuracy. B: poor precision, good accuracy. |
|   | c.  | A: good precision, good accuracy. B: good precision, poor accuracy. |
|   | d.  | A: poor precision, good accuracy. B: good precision, poor accuracy. |
|   | e.  | A: good precision, poor accuracy. B: poor precision, good accuracy. |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 31. A student uses a balance to determine the mass of an object as 5.719 grams. The correct mass of the object is 5.586 grams. What is the percent error in the student's mass determination?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 2.38% | b.  | 0.133% | c.  | 13.3% | d.  | 74.3% | e.  | 97.7% |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 32. Two students independently determine the volume of water delivered by a 10.00-mL pipet. Each student takes 8 measurements, then computes the average volume delivered and the standard deviation. The results are tabulated below.

|  |  |  |  |
| --- | --- | --- | --- |
|   |   | Average | St. Dev. |
|   | Student A | 10.4 mL | ±0.7 mL |
|   | Student B | 10.00 mL | ±0.02 mL |

Which statement best describes the results?

|  |  |  |
| --- | --- | --- |
|   | a.  | A: good precision, good accuracy. B: good precision, good accuracy. |
|   | b.  | A: good precision, poor accuracy. B: poor precision, good accuracy. |
|   | c.  | A: poor precision, good accuracy. B: good precision, poor accuracy. |
|   | d.  | A: poor precision, poor accuracy. B: good precision, good accuracy. |
|   | e.  | A: poor precision, poor accuracy. B: poor precision, poor accuracy. |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 33. Assuming a large number of measurements is used to calculate the average of measurements, slightly more than \_\_\_\_\_ of the values collected are expected to be within two standard deviations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 50% | b.  | 68% | c.  | 83% | d.  | 95% |
|   | e.  | 100% |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 34. As the standard deviation of an average of several measurements increases, \_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | the accuracy of the measurement increases. |
|   | b.  | the precision of the measurement increases. |
|   | c.  | the accuracy and precision of the measurement decreases. |
|   | d.  | the accuracy of the measurement decreases. |
|   | e.  | the precision of the measurement decreases. |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 35. Express 0.00580 in exponential notation.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 5.80 × 103 | b.  | 5.8 × 10–3 | c.  | 5.80 × 10–3 | d.  | 5.8 × 103 |
|   | e.  | 5.800 × 10–3 |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 36. Express 2.260 × 101 in fixed notation.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 0.2260 | b.  | 2.260 | c.  | 2.260 | d.  | 22.6 | e.  | 22.60 |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
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| 37. Convert 1.400× 10–8 liters to nanoliters and express the answer in fixed notation using the correct number of significant figures.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 14 nL | b.  | 14.0 nL | c.  | 14.00 nL | d.  | 1.40 nL |
|   | e.  | 0.1400 nL |  |  |  |  |  |  |

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| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 38. Convert 0.390 ng to milligrams and express the answer in scientific notation using the correct number of significant figures.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3.90 × 10–5 mg |
|   | b.  | 3.90 × 10–7 mg |
|   | c.  | 3.9 × 10–7 mg |
|   | d.  | 0.390 × 10–8 mg |
|   | e.  | 0.390 × 10–7 mg |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 39. An electronic balance is used to determine that a sample has a mass of 8.94656 g. If the balance's precision is ±0.09 mg, what is the correct number of significant figures for this measurement?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 2 | b.  | 3 | c.  | 4 | d.  | 5 |
|   | e.  | 6 |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 40. The number of significant figures in 2.1948 × 10–9 nm is \_\_\_\_\_.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 5 | b.  | 6 | c.  | 3 | d.  | 7 |
|   | e.  | 4 |  |  |  |  |  |  |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics of Chemistry |
| *NOTES:* | Dynamic Question |
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| 41. How many significant figures are there in the value 0.0490 g/mL?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 4 | b.  | 3 | c.  | 2 | d.  | 5 | e.  | 6 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 42. How many significant figures are there in the number 4.700?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 | b.  | 5 | c.  | 3 | d.  | 4 | e.  | 2 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 43. Round 0.00274485 to 1 significant figure.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 0.00 | b.  | 0.003 | c.  | 0.0027 | d.  | 0.00274 |
|   | e.  | 0.002745 |  |  |  |  |  |  |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 44. Using the rules of significant figures, calculate the following:(2.335 + 7.026) ÷ 2.57 = \_\_\_\_\_

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 3.642 | b.  | 3.6424 | c.  | 3.6 | d.  | 3.64 |
|   | e.  | 3.64241 |  |  |  |  |  |  |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics of Chemistry |
| *NOTES:* | Dynamic Question |
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| 45. What is the correct answer to the expression below?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 8.13 cm | b.  | 8.1280 cm | c.  | 8.1 cm | d.  | 8.128 cm |
|   | e.  | 8 cm |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 46. What is the correct answer to the following expression?8.67 × 10–10 + 6.22 × 10–12

|  |  |  |
| --- | --- | --- |
|   | a.  | 8.7322 × 10–10 |
|   | b.  | 8.732 × 10–10 |
|   | c.  | 9 × 10–10 |
|   | d.  | 8.7 × 10–10 |
|   | e.  | 8.73 × 10–10 |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 47. Carry out the following calculation and report your answer to the correct number of sig figs:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1.6 | b.  | 1.57 | c.  | 1.566 | d.  | 1.5662 |
|   | e.  | 1.56625 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 48. Calculate the following:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1 × 10–220 | b.  | 1 × 10540 | c.  | 1 × 10–740 | d.  | 1 × 10–940 |
|   | e.  | 1 × 10–420 |  |  |  |  |  |  |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics of Chemistry |
| *NOTES:* | Dynamic Question |
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| 49. Express the result of the following calculation in scientific notation: 437 cm × 885 cm

|  |  |  |
| --- | --- | --- |
|   | a.  | 38.7 × 104 cm2 |
|   | b.  | 38.7 × 105cm2 |
|   | c.  | 4 × 104cm2 |
|   | d.  | 4 × 106cm2 |
|   | e.  | 4 × 105cm2 |

|  |  |
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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
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| 50. Express the result of the following calculation in scientific notation: 0.0573 cm2 ÷ 81.8 cm

|  |  |  |
| --- | --- | --- |
|   | a.  | 7 × 105 cm |
|   | b.  | 7 × 104 cm |
|   | c.  | 7 × 10–3 cm |
|   | d.  | 7 × 10–4 cm |
|   | e.  | 1 × 103 cm |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 51. Using the rules of significant figures, calculate the following:

|  |  |  |  |  |  |  |  |  |
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|   | a.  | 4.825 | b.  | 4.8249 | c.  | 4.8 | d.  | 4.82 |
|   | e.  | 4.82486 |  |  |  |  |  |  |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics of Chemistry |
| *NOTES:* | Dynamic Question |
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| 52. Three different samples were weighed using a different type of balance for each sample. The three were found to have masses of 0.6160959 kg, 3.225 mg, and 5480.7 g. The total mass of the samples should be reported as

|  |  |  |
| --- | --- | --- |
|   | a.  | 6096.8 g. |
|   | b.  | 6097 g. |
|   | c.  | 6096.799 g. |
|   | d.  | 6096.799125 g. |
|   | e.  | 6096.7991 g. |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 53. The answer that should be reported for the total mass of solution when 67.90 mg of benzene is added to 7.45 g of toluene is

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 7.51790 g. | b.  | 7.52 g. | c.  | 7.5179 g. | d.  | 7.518 g. |
|   | e.  | 7.5 g. |  |  |  |  |  |  |

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| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 54. The mass of a sample is measured by difference: first the mass of a beaker is measured (71.5 g), and a small amount of the sample is added to the beaker. The mass of the sample plus beaker is then measured to be 77.873 g. The number of significant figures that should be reported for the mass of the sample is

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 2. | b.  | 1. | c.  | 5. | d.  | 4. |
|   | e.  | 3. |  |  |  |  |  |  |

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| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
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| 55. In the given figure, what is the length of the bar in centimeters as measured by the ruler?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 10.140 cm | b.  | 10.14 cm | c.  | 10.10 cm | d.  | 10.1 cm |
|   | e.  | 10.17 cm |  |  |  |  |  |  |

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| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics of Chemistry |
| *NOTES:* | Dynamic Question |
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| 56. The volume of a carbon atom is 1.9 × 10–30 m3. What is the approximate radius of the atom in picometers (pm)? The volume of a sphere is (4/3)π*r*3.

|  |  |  |
| --- | --- | --- |
|   | a.  | 77 pm |
|   | b.  | 520 pm |
|   | c.  | 770 pm |
|   | d.  | 3.0 × 102 pm |
|   | e.  | 52 pm |

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| *ANSWER:* | a |
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| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 57. The volume of space occupied by a beryllium atom is 6.0 × 10–30 m3. What is this volume in units of nm3?

|  |  |  |
| --- | --- | --- |
|   | a.  | 6.0 × 10–57 nm |
|   | b.  | 6.0 × 10–21 nm |
|   | c.  | 6.0 × 10–12 nm |
|   | d.  | 6.0 × 10–3 nm |
|   | e.  | 6.0 × 106 nm |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 58. How many feet (ft) make up 0.397 km if 1 mi = 1.609 km and 5280 ft = 1 mi?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1303.10 ft |
|   | b.  |  ft |
|   | c.  |  ft |
|   | d.  | 3370.000 ft |
|   | e.  |  ft |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 59. What is the volume of a cube that has an edge length of 0.011 m?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.3 × 10–3 m3 |
|   | b.  | 1.3 × 10–3 km3 |
|   | c.  | 1.3 × 10–3 cm3 |
|   | d.  | 1.3 × 10–3 mm3 |
|   | e.  | 1.3 cm3 |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 60. Convert 42.12 cm3 to cubic inches (in3) given that 1 inch = 2.54 cm (exact).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 2.570 in3 | b.  | 16.580 in3 | c.  | 107.0 in3 | d.  | 690.200 in3 |
|   | e.  | 0.3890 in3 |  |  |  |  |  |  |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 61. How many cubic millimeters equal one cubic meter?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 104 | b.  | 10–9 | c.  | 103 | d.  | 109 | e.  | 10–3 |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 62. A cylinder has a radius of 2.38 mm and a height of 175 mm. Calculate the volume of the cylinder in liters. (Volume = π*r*2*h*)

|  |  |  |
| --- | --- | --- |
|   | a.  | 3.11 × 10–3 L |
|   | b.  | 3.11 × 10–2 L |
|   | c.  | 0.311 L |
|   | d.  | 3.11 L |
|   | e.  | 3.11 × 103 L |

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| *ANSWER:* | a |
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| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 63. A car averages 26.5 miles per gallon of gasoline. How many liters of gasoline will be needed for a trip of 621 km? Some conversion factors that may be helpful are the following:1 qt = 0.946 L 1 mile = 1.609 km 4 qt = 1 gal (exact) 1 ft = 12 in (exact)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 6 × 101 L | b.  | 7 × 103 L | c.  | 3 × 103 L | d.  | 1 × 102 L | e.  | 4 × 104 L |

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| *ANSWER:* | a |
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| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 64. The SI unit for the diffusion coefficient is m2/s, but older texts sometimes report diffusion coefficients in units of in2/min. What is the value of a diffusion coefficient of 21.3 in2/min expressed in SI units? (2.54 cm = 1 in exactly)

|  |  |  |
| --- | --- | --- |
|   | a.  | 9.02 × 10–3 m2/s |
|   | b.  | 3.25 × 105 m2/s |
|   | c.  | 14.0 m2/s |
|   | d.  | 5.50 × 102 m2/s |
|   | e.  | 2.29 × 10–4 m2/s |

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| *ANSWER:* | e |
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| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 65. The speed of light in a vacuum is 3.00 × 108 m/s. What is the speed of light in units of kilometers per hour?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.20 × 10–2 km/hr |
|   | b.  | 8.33 × 101 km/hr |
|   | c.  | 8.33 × 107 km/hr |
|   | d.  | 1.08 × 109 km/hr |
|   | e.  | 1.08 × 1015 km/hr |

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| *ANSWER:* | d |
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| 66. If a gallon (3.78 L) of latex paint can cover 365 ft2 of the surface of a wall, what is the average thickness of one coat of paint (in millimeters)? (12 in = 1 ft, 2.54 cm = 1 in)

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.11 × 10–1 mm |
|   | b.  | 2.83 × 10–1 mm |
|   | c.  | 4.64 × 10–1 mm |
|   | d.  | 4.89 × 10–1 mm |
|   | e.  | 3.40 mm |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
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| 67. Silver chloride (AgCl) is relatively insoluble in water. At 25 °C, 1.3 × 103 L of water is needed to dissolve 2.5 g of AgCl. What mass (in milligrams) of AgCl will dissolve in 1.0 L of water?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.9 × 10–3 mg |
|   | b.  | 1.9 mg |
|   | c.  | 0.52 mg |
|   | d.  | 520 mg |
|   | e.  | 1.9 × 10–6 mg |

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| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
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| 68. Calcium carbonate, or limestone, is relatively insoluble in water. At 25 °C, only 5.8 mg will dissolve in 1.0 liter of water. What volume of water is needed to dissolve 5.0 g of calcium carbonate?

|  |  |  |
| --- | --- | --- |
|   | a.  | 4.6 × 10–3 L |
|   | b.  | 3.0 × 10–2 L |
|   | c.  | 1.4 × 102 L |
|   | d.  | 3.4 × 102 L |
|   | e.  | 8.6 × 102 L |

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| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 69. Calculate the mass of silver that occupies the same volume as 22.1 g of cobalt. The density of cobalt is 8.90 g/cm3 and the density of silver is 10.50 g/cm3.

|  |  |  |
| --- | --- | --- |
|   | a.  | 4.23 g |
|   | b.  | 26.1 g |
|   | c.  | 2 × 103 g |
|   | d.  | 0.0534 g |
|   | e.  | 0.236 g |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 70. The density of a particular solid is 7.62 g/cm3 at 25°C. What is its density in kilograms per cubic meter (kg/m3)?

|  |  |  |
| --- | --- | --- |
|   | a.  | 7.62 × 1010 |
|   | b.  | 7.62 × 101 |
|   | c.  | 7.62 × 10–2 |
|   | d.  | 7.62 × 103 |
|   | e.  | 7.62 × 107 |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 71. What length of a cylindrical piece of tungsten wire having a radius of 2.27 mm has a mass of 10.0 g? The density of tungsten is 19.25 g/cm3 and Volume = *πr2h*.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3.21 × 10–4 m |
|   | b.  | 3.12 × 101 m |
|   | c.  | 3.21 × 10–2 m |
|   | d.  | 3.12 × 10–1 m |
|   | e.  | 3.12 × 10–3 m |

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| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 72. What volume of a pure liquid (density 0.720 g/mL) has a mass of 0.420 kg?

|  |  |  |
| --- | --- | --- |
|   | a.  | 5.83 × 102 mL |
|   | b.  | 1.71 × 10–3 mL |
|   | c.  | 3.02 × 10–1 mL |
|   | d.  | 1.710 × 105 mL |
|   | e.  | 5.83 × 10–1 mL |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 73. An empty Erlenmeyer flask weighs 248.3 g . When filled with ethyl alcohol (density = 0.789 g/mL), the flask and its contents weigh 597.2 g. What volume of ethyl alcohol does the flask hold?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 217 mL | b.  | 275 mL | c.  | 349 mL | d.  | 442 mL |
|   | e.  | 196 mL |  |  |  |  |  |  |

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| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 74. You can identify a metal by carefully determining its density. A 29.51 g sample of an unknown metal is 1.50 cm long, 2.50 cm wide, and 1.00 cm thick. What is the possible identity of the element?

|  |  |  |
| --- | --- | --- |
|   | a.  | Nickel; density = 8.90 g/cm3 |
|   | b.  | Aluminum; density = 2.70 g/cm3 |
|   | c.  | Silver; density = 10.5 g/cm3 |
|   | d.  | Iron; density = 7.87 g/cm3 |
|   | e.  | Chromium; density = 7.20 g/cm3 |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 75. A thin sheet of iridium metal that is 2.70 cm by 5.93 cm has a mass of 16.1 g and a thickness of 0.444 mm. What is the density of iridium?

|  |  |  |
| --- | --- | --- |
|   | a.  | 22.600 g/cm3 |
|   | b.  | 2.270 g/cm3 |
|   | c.  | 1.14 × 102 g/cm3 |
|   | d.  | 0.044 g/cm3 |
|   | e.  | 0.442 g/cm3 |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 76. A 4.75 cm3 sample of solid gallium metal has a density of 5.910 g/cm3. What volume does this sample of gallium occupy in its liquid state? The density of liquid gallium is 6.100 g/cm3.

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|   | a.  | 4.60 cm3 | b.  | 4.90 cm3 | c.  | 0.13 cm3 | d.  | 171.00 cm3 |
|   | e.  | 0.20 cm3 |  |  |  |  |  |  |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 77. How many 500-mg aspirin tablets can be made from 50.0 kg of aspirin?

|  |  |  |
| --- | --- | --- |
|   | a.  | 10,000,000 |
|   | b.  | 1,000,000 |
|   | c.  | 1000 |
|   | d.  | 10,000 |
|   | e.  | 100,000 |

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| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 78. A piece of metal (mass = 17.268 g) is placed in 10.50 mL of chloroform (*d* = 1.498 g/mL) in a 25-mL graduated cylinder. The chloroform level increases to 15.46 mL. The best value for density of this metal from these data is

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 1.12 g/mL. | b.  | 2.32 g/mL. | c.  | 3.481 g/mL. | d.  | 5.22 g/mL. |
|   | e.  | 3.48 g/mL. |  |  |  |  |  |  |

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| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 79. Which response has the correct number of significant figures and units for the following mathematical operation?​

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| --- | --- | --- |
|   | a.  | 2.206 × 10–5 J/cal |
|   | b.  | 2 × 10–5 kcal |
|   | c.  | 2.206 × 10–5 kcal |
|   | d.  | 2.21 × 10–5 kcal |
|   | e.  | 2.2 × 10–5 kcal |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 80. The average speed of oxygen molecules at 570°C is 1.49 × 105 cm/s. Which of the following calculations would convert this speed to units of miles per hour?

|  |  |  |
| --- | --- | --- |
|   | a.  |  |
|   | b.  |  |
|   | c.  |  |
|   | d.  |  |
|   | e.  |  |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 81. The distance from Austin, Texas, to Lincoln, Nebraska, is 822 miles by car. Which of the following series of calculations will yield this distance in units of kilometers?(1 in = 2.54 cm (exact), 1 mi = 5280 ft (exact), 1 ft = 12 in (exact))

|  |  |  |
| --- | --- | --- |
|   | a.  |  |
|   | b.  |  |
|   | c.  |  |
|   | d.  |  |
|   | e.  |  |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 82. A general chemistry student found a chunk of metal in the basement of a friend's house. She measured the mass of the metal to be 145.0 g. Then she dropped the metal into a graduated cylinder containing 29.0 mL of water, and the water level rose to 35.8 mL. Of the following metals, which is the most likely:

|  |  |  |
| --- | --- | --- |
|   | a.  | Aluminum, d = 2.72 g/mL |
|   | b.  | Silver, d = 10.50 g/mL |
|   | c.  | Lead, d = 11.34 g/mL |
|   | d.  | Tungsten, d = 19.38 g/mL |
|   | e.  | Platinum, d = 21.46 g/mL |

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| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *NOTES:* | Dynamic Question |
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| 83. A graph of a certain set of data is shown to be linear with a trendline of y =  32.0x + 8. What is the sign and slope of the trendline obtained from this data?

|  |  |  |
| --- | --- | --- |
|   | a.  | positive, 32.0 |
|   | b.  | negative, 32.0 |
|   | c.  | positive, 8 |
|   | d.  | negative, 8 |
|   | e.  | positive, 40.0 |

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| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.5 Graphs and Graphing |
| *NOTES:* | Dynamic Question |
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| 84. A graph of number of marbles (y-axis) versus the weight of the marbles (x-axis, grams) is shown to be linear with a trendline of y = 2.7x. What is the weight of the marbles when the number of marbles is 11?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | a.  | 29 | b.  | 0 | c.  | 3 | d.  | 10 |
|   | e.  | 4 |  |  |  |  |  |  |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.5 Graphs and Graphing |
| *NOTES:* | Dynamic Question |
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| 85. Assuming the density of water is 1.00 g/cm3, the mass of 1.0 cubic meter (m3) of water is \_\_\_\_\_ g.

|  |  |
| --- | --- |
| *ANSWER:* | 1.0 × 106 |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
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| 86. What is the difference between the accuracy of measurements and the precision of measurements?

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| *ANSWER:* | Accuracy is an indicator of how close a measurement, or the average of a set of measurements, is to the correct value. Precision is an indicator of how close two measurements are to each other, or how much numerical spread is present in a set of measurements. |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 87. Significant figures allow us to estimate uncertainty in calculated values. In some circumstances, following significant figure rules can lead to estimates of uncertainty that are too high or low. This is the case for the mathematical expression below.99 × 1.02 = 100.98Following the rules governing significant figures in multiplication, the answer can be rounded to 1.0 × 102. What is wrong with rounding this answer to two significant figures?

|  |  |
| --- | --- |
| *ANSWER:* | Assume that the absolute uncertainty in a value is equal to ±1 in the answer’s final digit. An absolute uncertainty of ±1 in the value 99 is approximately a 1% relative uncertainty. Likewise, the absolute and relative uncertainty of 1.02 is ±0.01 and 1%, respectively. If both values have percent relative uncertainties of 1%, then their product ought to have an uncertainty close to 1%. But, by rounding to 2 significant figures, we have estimated the percent relative uncertainty to be 10%. |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
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| 88. As part of the calibration of a new laboratory balance, a solid with a mass of 0.200 g is taken as a standard and determined with the following results:Trial Mass1   0.197 g2   0.192 g3   0.212 gAverage mass:    0.200     g

|  |  |  |
| --- | --- | --- |
|   | a.  | The balance is both accurate and precise. |
|   | b.  | The balance is accurate but imprecise. |
|   | c.  | The balance is precise but inaccurate. |
|   | d.  | The balance is both inaccurate and imprecise. |
|   | e.  | None of these |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.2 Making Measurements: Precision, Accuracy, Experimental Error, and Standard Deviation |
| *NOTES:* | Dynamic Question |
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| 89. ​Express the number 0.000160 in scientific notation.

|  |  |  |
| --- | --- | --- |
|   | a.  | ​0.16 × 10–3 |
|   | b.  | ​1.6 × 104 |
|   | c.  | ​1.6 × 102 |
|   | d.  | ​1.6 ​× 10–4 |
|   | e.  | 160 ​​× 10–6 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *TOPICS:* | Review.3 Mathematics in Chemistry |
| *NOTES:* | Dynamic Question |
| *DATE CREATED:* | 8/12/2014 3:53 PM |
| *DATE MODIFIED:* | 8/12/2014 4:21 PM |

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| 90. The absolute zero point on the Kelvin scale is equal to \_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
|   | a.  | –273.15 °C |
|   | b.  | 0 °C |
|   | c.  | 14.5 °C |
|   | d.  | 25 °C |
|   | e.  | –373.15 ⁰C |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.1 Units of Measurement |
| *DATE CREATED:* | 1/31/2018 4:52 AM |
| *DATE MODIFIED:* | 1/31/2018 4:54 AM |

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| 91. Which of the following statements about dimensional analysis is true?

|  |  |  |
| --- | --- | --- |
|   | a.  | It is a general problem-solving approach that uses the dimensions or units of each value to guide us through calculations. |
|   | b.  | It is a problem-solving approach that guides us through calculations without using conversion factors. |
|   | c.  | It is a method of calculation that uses graphs for deriving exact values. |
|   | d.  | It is a method of calculation that does not require the use of a conversion factor. |
|   | e.  | It is a problem-solving approach that takes into consideration the standard deviation values. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *TOPICS:* | Review.4 Problem Solving by Dimensional Analysis |
| *DATE CREATED:* | 1/31/2018 4:59 AM |
| *DATE MODIFIED:* | 1/31/2018 5:03 AM |

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