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| 1. Which of the following is an example of a quantitative observation?

|  |  |  |
| --- | --- | --- |
|   | a.  | The piece of metal is longer than the piece of wood. |
|   | b.  | Solution 1 is much darker than solution 2. |
|   | c.  | The liquid in beaker A is blue. |
|   | d.  | The temperature of the liquid is 60°C. |
|   | e.  | At least two of the above (A-D) are quantitative observations. |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | scientific method |
| *OTHER:* | Conceptual |
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| 2. A quantitative observation

|  |  |  |
| --- | --- | --- |
|   | a.  | contains a number and a unit |
|   | b.  | does not contain a number |
|   | c.  | always makes a comparison |
|   | d.  | must be obtained through experimentation |
|   | e.  | is none of these |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
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| 3. Generally, observed behavior that can be formulated into a statement, sometimes mathematical in nature, is called a(n)

|  |  |  |
| --- | --- | --- |
|   | a.  | observation |
|   | b.  | measurement |
|   | c.  | theory |
|   | d.  | natural law |
|   | e.  | experiment |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | scientific method |
| *OTHER:* | Conceptual |
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| 4. The statement “The total mass of materials is not affected by a chemical change in those materials” is called a(n)

|  |  |  |
| --- | --- | --- |
|   | a.  | observation |
|   | b.  | measurement |
|   | c.  | theory |
|   | d.  | natural law |
|   | e.  | experiment |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | scientific method |
| *OTHER:* | Conceptual |
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| 5. A chemical theory that has been known for a long time becomes a law.

|  |  |  |
| --- | --- | --- |
|   | a.  | True |
|   | b.  | False |

|  |  |
| --- | --- |
| *ANSWER:* | False |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | True / False |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | scientific method |
| *OTHER:* | Conceptual |
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| 6. Which of the following metric relationships is incorrect?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1 microliter = 10–6 liters |
|   | b.  | 1 gram = 103 kilograms |
|   | c.  | 103 milliliters = 1 liter |
|   | d.  | 1 gram = 102 centigrams |
|   | e.  | 10 decimeters = 1 meter |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Quantitative |
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| 7. For which pair is the SI prefix not matched correctly with its meaning?

|  |  |  |
| --- | --- | --- |
|   | a.  | tera = 1012 |
|   | b.  | centi = 0.01 |
|   | c.  | kilo = 1000 |
|   | d.  | pico = 10-12 |
|   | e.  | deci = 10 |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 8. A metric unit for length is

|  |  |  |
| --- | --- | --- |
|   | a.  | gram |
|   | b.  | milliliter |
|   | c.  | yard |
|   | d.  | kilometer |
|   | e.  | pound |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | base unit | Chemistry | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 9. Which of the following is *not* a unit in the SI system?

|  |  |  |
| --- | --- | --- |
|   | a.  | ampere |
|   | b.  | candela |
|   | c.  | Kelvin |
|   | d.  | meter |
|   | e.  | calorie |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | base unit | Chemistry | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 10. Order the four metric prefixes from smallest to largest.

|  |  |  |
| --- | --- | --- |
|   | a.  | nano- < milli- < centi- < deka- |
|   | b.  | milli- < nano- < centi- < deka- |
|   | c.  | deka- < centi- < nano- < milli- |
|   | d.  | deka- < centi- < milli- < nano- |
|   | e.  | centi- < nano- < deka- < milli- |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 11. 7.6 kilogram(s) contains this many grams.

|  |  |  |
| --- | --- | --- |
|   | a.  |  |
|   | b.  |  |
|   | c.  | 76 |
|   | d.  | 0.76 |
|   | e.  |  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | mass | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 12. Convert 0.2924 m to mm.

|  |  |  |
| --- | --- | --- |
|   | a.  | 2.924 × 10-3 |
|   | b.  | 2.924 × 10-4 |
|   | c.  | 0.02924 mm​ |
|   | d.  | 292.4 mm​ |
|   | e.  | none  of  these​ |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 13. 5.3 seconds contain this many picoseconds.

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

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 14. 4.25 seconds contain this many nanoseconds.

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

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 15. The distance of 57 km equals

|  |  |  |
| --- | --- | --- |
|   | a.  | 5700 m |
|   | b.  | 0.57 m |
|   | c.  | 570 m |
|   | d.  | 0.057 m |
|   | e.  | 5.7 × 104m |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | prefixes | SI unit |
| *OTHER:* | Conceptual |
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| 16. What is the measure of resistance an object has to a change in its state of motion?

|  |  |  |
| --- | --- | --- |
|   | a.  | mass |
|   | b.  | weight |
|   | c.  | volume |
|   | d.  | length |
|   | e.  | none of these |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 17. The degree of agreement among several measurements of the same quantity is called \_\_\_\_\_\_\_\_\_\_. It reflects the reproducibility of a given type of measurement.

|  |  |  |
| --- | --- | --- |
|   | a.  | accuracy |
|   | b.  | error |
|   | c.  | precision |
|   | d.  | significance |
|   | e.  | certainty |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 18. As part of the calibration of a new laboratory balance, a 1.000-g mass is weighed with the following results:

|  |  |  |
| --- | --- | --- |
|   | **Trial** | **Mass** |
|   | 1 | 1.201 ± 0.001 |
|   | 2 | 1.202 ± 0.001 |
|   | 3 | 1.200 ± 0.001 |

The balance is:

|  |  |  |
| --- | --- | --- |
|   | a.  | Both accurate and precise. |
|   | b.  | Accurate but imprecise. |
|   | c.  | Precise but inaccurate. |
|   | d.  | Both inaccurate and imprecise. |
|   | e.  | Accuracy and precision are impossible to determine with the available information. |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| --- | --- |
| Consider the following three archery targets: |   |

I.   II.  III. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19. Which of the following figure(s) represent a result having high precision?

|  |  |  |
| --- | --- | --- |
|   | a.  | Figure I only |
|   | b.  | Figure II only |
|   | c.  | Figure III only |
|   | d.  | Figure I and Figure II |
|   | e.  | Figure II and Figure III |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-1 |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
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| 20. Which of the following statements concerning these figures is correct?

|  |  |  |
| --- | --- | --- |
|   | a.  | Figure I represents systematic error and Figure II represents random error. |
|   | b.  | Figure I represents random error and Figure II represents systematic error. |
|   | c.  | Figure I and Figure II represent random error. |
|   | d.  | Figure I and Figure II represent systematic error. |
|   | e.  | Figure III represents no errors. |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-1 |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
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| 21. Which of the following is the least probable concerning five measurements taken in the lab?

|  |  |  |
| --- | --- | --- |
|   | a.  | The measurements are accurate and precise. |
|   | b.  | The measurements are accurate but not precise. |
|   | c.  | The measurements are precise but not accurate. |
|   | d.  | The measurements are neither accurate nor precise. |
|   | e.  | All of these are equally probable. |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 22. You measure water in two containers: a 10-mL graduated cylinder with marks at every mL, and a 1-mL pipet marked at every 0.1 mL. If you have some water in each of the containers and add them together, to what decimal place could you report the total volume of water?

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.01 mL |
|   | b.  | 0.1 mL |
|   | c.  | 1 mL |
|   | d.  | 10 mL |
|   | e.  | none of these |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 23. The agreement of a particular value with the true value is called

|  |  |  |
| --- | --- | --- |
|   | a.  | accuracy |
|   | b.  | error |
|   | c.  | precision |
|   | d.  | significance |
|   | e.  | certainty |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
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| 24. The amount of uncertainty in a measured quantity is determined by:

|  |  |  |
| --- | --- | --- |
|   | a.  | both the skill of the observer and the limitations of the measuring instrument |
|   | b.  | neither the skill of the observer nor the limitations of the measuring instrument |
|   | c.  | the limitations of the measuring instrument only |
|   | d.  | the skill of the observer only |
|   | e.  | none of these |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 25. A scientist obtains the number 0.045006700 on a calculator. If this number actually has four (4) significant figures, how should it be written?

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.4567 |
|   | b.  | 0.4501 |
|   | c.  | 0.0450 |
|   | d.  | 0.04500 |
|   | e.  | 0.04501 |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | rounding | significant figures |
| *OTHER:* | Conceptual |
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| 26. Express the number 0.000779 in scientific notation.

|  |  |  |
| --- | --- | --- |
|   | a.  | 779 × 10–6 |
|   | b.  | 7.79 × 102 |
|   | c.  | 7.79 × 104 |
|   | d.  | 7.79 × 10–4 |
|   | e.  | 0.779 × 10–3 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
| *OTHER:* | Conceptual |
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| 27. Express 165,000 in exponential notation.

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

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
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| 28. Express the number 0.0610 in scientific notation.

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.61 × 103 |
|   | b.  | 61.0 × 100 |
|   | c.  | 610 × 10–4 |
|   | d.  | 6.10 × 10–2 |
|   | e.  | 0.610 × 10–1 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
| *OTHER:* | Conceptual |
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| 29. Express the number 5.16 × 10–3in common decimal form.

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.00516 |
|   | b.  | 5160 |
|   | c.  | 5.16 |
|   | d.  | 0.000516 |
|   | e.  | 0.0516 |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
| *OTHER:* | Conceptual |
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| 30. Express the number 2.07 × 104in common decimal form.

|  |  |  |
| --- | --- | --- |
|   | a.  | 207000 |
|   | b.  | 0.0000207 |
|   | c.  | 0.000207 |
|   | d.  | 20700 |
|   | e.  | 2070 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
| *OTHER:* | Conceptual |
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| 31. We generally report a measurement by recording all of the certain digits plus \_\_\_\_ uncertain digit(s).

|  |  |  |
| --- | --- | --- |
|   | a.  | no |
|   | b.  | one |
|   | c.  | two |
|   | d.  | three |
|   | e.  | four |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 32. The beakers shown below have different precisions as shown.                    Suppose you pour the water from these three beakers into one container. What would be the volume in the container reported to the correct number of significant figures?

|  |  |  |
| --- | --- | --- |
|   | a.  | 78.817 mL |
|   | b.  | 78.82 mL |
|   | c.  | 78.8 mL |
|   | d.  | 80 mL |
|   | e.  | 79 mL |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 33. You are asked to determine the perimeter of the cover of your textbook. You measure the length as 36.71 cm and the width as 24.83 cm. How many significant figures should you report for the perimeter?

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

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 34. Consider the numbers 23.68 and 4.12. The sum of these numbers has \_\_\_\_ significant figures, and the product of these numbers has \_\_\_\_ significant figures.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3, 3 |
|   | b.  | 4, 4 |
|   | c.  | 3, 4 |
|   | d.  | 4, 3 |
|   | e.  | none of these |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 35. Using the rules of significant figures, calculate the following:

|  |  |  |
| --- | --- | --- |
|   | a.  | 11 |
|   | b.  | 12 |
|   | c.  | 11 |
|   | d.  | 61 |
|   | e.  | 11 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 36. Using the rules of significant figures, calculate the following: 4.0021 –1.779

|  |  |  |
| --- | --- | --- |
|   | a.  | 2 |
|   | b.  | 2.223 |
|   | c.  | 2.2 |
|   | d.  | 2.22 |
|   | e.  | 2.2231 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 37. How many significant figures are there in the number 0.04560700?

|  |  |  |
| --- | --- | --- |
|   | a.  | 4 |
|   | b.  | 5 |
|   | c.  | 7 |
|   | d.  | 8 |
|   | e.  | 9 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 38. How many significant figures are there in the number 0.0006728?

|  |  |  |
| --- | --- | --- |
|   | a.  | 7 |
|   | b.  | 3 |
|   | c.  | 8 |
|   | d.  | 4 |
|   | e.  | 0 |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
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| *OTHER:* | Conceptual |
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| 39. How many significant figures are there in the number 3.1400?

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

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| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
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| 40. How many significant figures should be reported for the difference between 18.7378 mL and 18.57 mL?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1 |
|   | b.  | 2 |
|   | c.  | 3 |
|   | d.  | 4 |
|   | e.  | 6 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 41. What is the best answer to report for

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.90478009 g/mL |
|   | b.  | 1.904 g/mL |
|   | c.  | 1.9876 g/mL |
|   | d.  | 1.9 g/mL |
|   | e.  | 1 g/mL |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 42. What is the best answer to report for (749 × 0.0043) + 22.97?

|  |  |  |
| --- | --- | --- |
|   | a.  | 26.191 |
|   | b.  | 26.19 |
|   | c.  | 26.1907 |
|   | d.  | 26 |
|   | e.  | 26.2 |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 43. Convert 2959.1 g to mg.

|  |  |  |
| --- | --- | --- |
|   | a.  | 2.9591 mg |
|   | b.  | 29.591 mg |
|   | c.  | 295.91 mg |
|   | d.  |  mg |
|   | e.  |  mg |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
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| *OTHER:* | Quantitative |
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| 44. Express the volume 329.0 cm3in liters.

|  |  |  |
| --- | --- | --- |
|   | a.  | 329.0 L |
|   | b.  | 32.90 L |
|   | c.  | 3.290 L |
|   | d.  | 0.3290 L |
|   | e.  | 0.03290 L |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
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| *OTHER:* | Quantitative |
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| 45. Convert 36.1 to cm3.

|  |  |  |
| --- | --- | --- |
|   | a.  |  cm3 |
|   | b.  |  cm3 |
|   | c.  |  cm3 |
|   | d.  |  cm3 |
|   | e.  |  cm3 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 46. The pressure of the earth's atmosphere at sea level is 14.7 lb/in2. What is the pressure when expressed in kg / m2? (2.54 cm = 1 in., 2.205 lb = 1 kg)

|  |  |  |
| --- | --- | --- |
|   | a.  |  kg / m2 |
|   | b.  |  kg / m2 |
|   | c.  |  kg / m2 |
|   | d.  |  kg / m2 |
|   | e.  |  kg / m2 |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 47. Convert 4471 mL to qt. (1 L = 1.06 qt)

|  |  |  |
| --- | --- | --- |
|   | a.  | 4739 qt |
|   | b.  | 4.218 qt |
|   | c.  |  qt |
|   | d.  | 4218 qt |
|   | e.  | 4.739 qt |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 48. Convert 96.0 lb to g. (1 lb = 453.6 g)

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

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 49. Convert 40.8 mi to km. (1 m = 1.094 yd, 1 mi = 1760 yd)

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

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 50. The density of liquid chloroform is 1.48 g/mL. What is its density in units of ? (2.54 cm = 1 in., 2.205 lb = 1 kg)

|  |  |  |
| --- | --- | --- |
|   | a.  |   |
|   | b.  |   |
|   | c.  |   |
|   | d.  |   |
|   | e.  | 0.199  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 51. Convert 0.0978 to L. (2.54 cm = 1 in., 1 L = 1 )

|  |  |  |
| --- | --- | --- |
|   | a.  |  L |
|   | b.  | 2.77 L |
|   | c.  |  L |
|   | d.  |  L |
|   | e.  | 3.21 L |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 52. In March 2008, gold reached a milestone value of $1000 per troy ounce. At that price, what was the cost of a gram of gold? (1 troy ounce = 31.10 g)

|  |  |  |
| --- | --- | --- |
|   | a.  | less than $1 |
|   | b.  | between $1 and $10 |
|   | c.  | between $10 and $50 |
|   | d.  | between $50 and $100 |
|   | e.  | over $100 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 53. It is estimated that uranium is relatively common in the earth's crust, occurring in amounts of 4 g / metric ton. A metric ton is 1000 kg. At this concentration, what mass of uranium is present in 2.0 mg of the earth's crust?

|  |  |  |
| --- | --- | --- |
|   | a.  | 8 *µ*g |
|   | b.  | 8 mg |
|   | c.  | 8 ng |
|   | d.  | 8 cg |
|   | e.  | 8 × 10¯5 g |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 54. A 20.0 mL sample of glycerol has a mass of 25.8 grams. What is the density of glycerol in ounces/quart? (1.00 ounce = 28.4 grams, and 1.00 liter = 1.06 quarts)

|  |  |  |
| --- | --- | --- |
|   | a.  | 42.9 oz/qt |
|   | b.  | 4.29 oz/qt |
|   | c.  | 857 oz/qt |
|   | d.  | 48.1 oz/qt |
|   | e.  | 25.8 oz/qt |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 55. During a physics experiment, an electron is accelerated to 67 percent of the speed of light. What is the speed of the electron in miles per hour? (speed of light = 3.00 × 108 m/s, 1 km = 0.6214 mi)

|  |  |  |
| --- | --- | --- |
|   | a.  |  mi/h |
|   | b.  |  mi/h |
|   | c.  |  mi/h |
|   | d.  |  mi/h |
|   | e.  |  mi/h |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 56. In the spring of 2008, petrol cost £1.049 per litre in London. On the same day, the exchange rate was $1 = £0.503. What was the price of London petrol in dollars ($) per gallon? (1 gal = 3.7854 L)

|  |  |  |
| --- | --- | --- |
|   | a.  | $3.97 /gal |
|   | b.  | $2.00 /gal |
|   | c.  | $7.89 /gal |
|   | d.  | $1.82 /gal |
|   | e.  | $7.53 /gal |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 57. For spring break you and some friends plan a road trip to a sunny destination that is 1705 miles away. If you drive a car that gets 39 miles per gallon and gas costs $3.339/gal, about how much will it cost to get to your destination?

|  |  |  |
| --- | --- | --- |
|   | a.  | $290 |
|   | b.  | $190 |
|   | c.  | $140 |
|   | d.  | $510 |
|   | e.  | $560 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 58. Convert 5.4 kg to lb. (1 kg = 2.205 lb)

|  |  |  |
| --- | --- | --- |
|   | a.  | 12 lbs |
|   | b.  | 1.2 lbs |
|   | c.  | 2.4 lbs |
|   | d.  | 0.012 lbs |
|   | e.  | 11.91 lbs |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
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| 59. Manganese makes up 1.3 × 10–4 percent by mass of the elements found in a normal healthy body. How many grams of manganese would be found in the body of a person weighing 274 lb? (2.205 lb = 1 kg)

|  |  |  |
| --- | --- | --- |
|   | a.  | 0.79 g |
|   | b.  | 0.16 g |
|   | c.  | 16 g |
|   | d.  | 79 g |
|   | e.  | 1.6 × 10–4 g |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 60. In 1928, 44.8 g of a new element was isolated from 660 kg of the ore molybdenite. The percent by mass of this element in the ore was:

|  |  |  |
| --- | --- | --- |
|   | a.  | 67 % |
|   | b.  | 6.6 % |
|   | c.  | 44.8 % |
|   | d.  | 0.0068 % |
|   | e.  | 29.6 % |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 61. 417 Kelvin equals

|  |  |  |
| --- | --- | --- |
|   | a.  | 144°F |
|   | b.  | 273°F |
|   | c.  | 690°F |
|   | d.  | 144°C |
|   | e.  | 690°C |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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| 62. The melting point of a certain element is 413°C. What is this on the Fahrenheit scale?

|  |  |  |
| --- | --- | --- |
|   | a.  | 502°F |
|   | b.  | 261°F |
|   | c.  | 1016°F |
|   | d.  | 775°F |
|   | e.  | 711°F |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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| 63. Convert: –47.1°C = \_\_\_\_\_\_\_\_\_\_\_\_ °F.

|  |  |  |
| --- | --- | --- |
|   | a.  | -84.8°F |
|   | b.  | -117°F |
|   | c.  | -52.8°F |
|   | d.  | 117°F |
|   | e.  | 225.9°F |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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| 64. As warm water sits in a cool room, you measure the temperature change (ΔT = Tfinal – Tinitial). Which of the following is true?

|  |  |  |
| --- | --- | --- |
|   | a.  | The temperature change (ΔT) is bigger if you are measuring in °F. |
|   | b.  | The temperature change (ΔT) is bigger if you are measuring in °C. |
|   | c.  | The temperature change (ΔT) will be the same regardless of the scale you use. |
|   | d.  | Answer A or B is correct, depending on the difference in temperature between the water and the room. |
|   | e.  | None of the above. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Conceptual |
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| 65. The melting point of fumaronitrile is 96.8°C. What is the melting point of fumaronitrile on the Fahrenheit scale?

|  |  |  |
| --- | --- | --- |
|   | a.  | 85.8°F |
|   | b.  | 174.2°F |
|   | c.  | 128.8°F |
|   | d.  | 369.8°F |
|   | e.  | 206.2°F |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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| 66. In 1984, some drums of uranium hexafluoride were lost in the English Channel, which is known for its cold water (about 16°C). The melting point of uranium hexafluoride is 148°F. In what physical state is the uranium hexafluoride in these drums?

|  |  |  |
| --- | --- | --- |
|   | a.  | solid |
|   | b.  | liquid |
|   | c.  | gas |
|   | d.  | a mixture of solid and liquid |
|   | e.  | not enough information |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Conceptual |
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| 67. The melting point of indium is 156.2°C. At 323°F, what is the physical state of indium?

|  |  |  |
| --- | --- | --- |
|   | a.  | Solid. |
|   | b.  | Liquid. |
|   | c.  | Gas. |
|   | d.  | Not enough information. |
|   | e.  | At 323°F, the indium is partially solid and partially liquid; there is an equilibrium between the two states. |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Conceptual |
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| 68. On a new temperature scale (°Z), water boils at 120.0°Z and freezes at 40.0°Z. Calculate the normal human body temperature using this temperature scale. On the Celsius scale, normal human body temperature could typically be 37.5°C, and water boils at 100.0°C and freezes at 0.00°C.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3000°Z |
|   | b.  | 12.5°Z |
|   | c.  | 70ºF |
|   | d.  | 113°Z |
|   | e.  | 30°Z |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 69. The calibration points for the linear Reaumur scale are the usual melting point of ice and boiling point of water, which are assigned the values 0°R and 80°R, respectively. The normal body temperature of humans is 98.6°F. What is this temperature in °R?

|  |  |  |
| --- | --- | --- |
|   | a.  | 178.6°R |
|   | b.  | 58.0ºR |
|   | c.  | 37ºR |
|   | d.  | 253.9°R |
|   | e.  | 29.6°R |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Conceptual |
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| 70.     A monolayer containing 3.21 × 10–6g of oleic acid has an area of 20.0 cm2. The density of oleic acid is 0.895 g / mL. What is the thickness of the monolayer (the length of an oleic acid molecule)?

|  |  |  |
| --- | --- | --- |
|   | a.  | 5.75 × 10¯5cm |
|   | b.  | 7.17 × 10¯5cm |
|   | c.  | 1.79 × 10¯7cm |
|   | d.  | 1.44 × 10¯7cm |
|   | e.  | 5.58 × 10¯6cm |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Quantitative |
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| 71. The density of gasoline is 0.7025 g/mL at 20°C. When gasoline is added to water:

|  |  |  |
| --- | --- | --- |
|   | a.  | It will float on top. |
|   | b.  | It will sink to the bottom. |
|   | c.  | It will mix so, you can't see it. |
|   | d.  | The mixture will improve the running of the motor. |
|   | e.  | None of these things will happen. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 72. A piece of indium with a mass of 21.93 g is submerged in 46.3 cm3 of water in a graduated cylinder. The water level increases to 49.3 cm3. The correct value for the density of indium from these data is:

|  |  |  |
| --- | --- | --- |
|   | a.  | 7.312671  |
|   | b.  | 7.3  |
|   | c.  | 0.13  |
|   | d.  | 0.444  |
|   | e.  | 2.24  |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Quantitative |
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| The density of a liquid is determined by successively weighing 25, 50, 75, 100, and 125 mL of the liquid in a 250-mL beaker. |

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| 73. If volume of liquid is plotted along the horizontal axis, and total mass of beaker plus liquid is plotted on the vertical axis:

|  |  |  |
| --- | --- | --- |
|   | a.  | The *x*, or horizontal, intercept is the negative value of the weight of the beaker. |
|   | b.  | The *y*, or vertical, intercept is the weight of the empty beaker. |
|   | c.  | The slope of the line is 1.0. |
|   | d.  | The line will pass through the origin. |
|   | e.  | The slope of the line is independent of the identity of the liquid. |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-2 |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 74. Considering the plot of total mass (*y*-axis) versus volume (*x*-axis), which of the following is true?

|  |  |  |
| --- | --- | --- |
|   | a.  | The plot should be rather linear because the slope measures the density of a liquid. |
|   | b.  | The plot should be curved upward because the slope measures the density of a liquid. |
|   | c.  | The plot should be curved upward because the mass of the liquid is higher in successive trials. |
|   | d.  | The plot should be linear because the mass of the beaker stays constant. |
|   | e.  | None of the above. |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-2 |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 75. A 20.0 mL sample of glycerol has a mass of 25.2 grams. What is the mass of a 63-mL sample of glycerol?

|  |  |  |
| --- | --- | --- |
|   | a.  | 8.0 g |
|   | b.  | 50 g |
|   | c.  |  g |
|   | d.  | 79 g |
|   | e.  | 79.4 g |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Quantitative |
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| 76. Suppose that you purchased a water bed with the dimensions 2.55 m × 2.53 dm × 291 cm. What mass of water does this bed contain?

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

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Quantitative |
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| 77. A freighter carrying a cargo of uranium hexafluoride sank in the English Channel in late August 1984. The cargo of uranium hexafluoride weighed 2.249 × 108kg and was contained in 30 drums, each containing  L of UF6. What is the density (g/mL) of uranium hexafluoride?

|  |  |  |
| --- | --- | --- |
|   | a.  | 51.0 g/mL |
|   | b.  | 0.196 g/mL |
|   | c.  | 5.10 g/mL |
|   | d.  | 1.53 g/mL |
|   | e.  | 2.25 g/mL |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Quantitative |
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| 78. The boiling of water is a

|  |  |  |
| --- | --- | --- |
|   | a.  | physical change because the water merely disappears |
|   | b.  | physical change because the gaseous water is chemically the same as the liquid |
|   | c.  | chemical change because heat is needed for the process to occur |
|   | d.  | chemical change because a gas (steam) is given off |
|   | e.  | chemical and physical damage |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 79. The state of matter for an object that has a definite volume but not a definite shape is

|  |  |  |
| --- | --- | --- |
|   | a.  | solid state |
|   | b.  | liquid state |
|   | c.  | gaseous state |
|   | d.  | elemental state |
|   | e.  | mixed state |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | states of matter |
| *OTHER:* | Conceptual |
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| 80. The state of matter for an object that has both definite volume and definite shape is

|  |  |  |
| --- | --- | --- |
|   | a.  | solid state |
|   | b.  | liquid state |
|   | c.  | gaseous state |
|   | d.  | elemental state |
|   | e.  | mixed state |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | states of matter |
| *OTHER:* | Conceptual |
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| 81. \_\_\_\_\_\_\_\_\_ are substances with constant composition that can be broken down into elements by chemical processes.

|  |  |  |
| --- | --- | --- |
|   | a.  | Solutions |
|   | b.  | Mixtures |
|   | c.  | Compounds |
|   | d.  | Quarks |
|   | e.  | Heterogeneous mixtures |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
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| 82. A method of separation that employs a system with two phases of matter, a mobile phase and a stationary phase, is called

|  |  |  |
| --- | --- | --- |
|   | a.  | filtration |
|   | b.  | chromatography |
|   | c.  | distillation |
|   | d.  | vaporization |
|   | e.  | homogenization |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | separation |
| *OTHER:* | Conceptual |
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| 83. Which of the following statements is false?

|  |  |  |
| --- | --- | --- |
|   | a.  | Solutions are always homogeneous mixtures. |
|   | b.  | The terms “atom” and “element” can have different meanings. |
|   | c.  | Elements can exist as atoms or molecules. |
|   | d.  | Compounds can exist as atoms or molecules. |
|   | e.  | At least two of the above statements (A-D) are false. |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 84. An example of a pure substance is

|  |  |  |
| --- | --- | --- |
|   | a.  | elements |
|   | b.  | compounds |
|   | c.  | pure water |
|   | d.  | carbon dioxide |
|   | e.  | all of these |

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 85. A solution is also called a

|  |  |  |
| --- | --- | --- |
|   | a.  | homogeneous mixture |
|   | b.  | heterogeneous mixture |
|   | c.  | pure mixture |
|   | d.  | compound |
|   | e.  | distilled mixture |

|  |  |
| --- | --- |
| *ANSWER:* | a |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | mixture |
| *OTHER:* | Conceptual |
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| Consider the following choices when answering questions 86-89. |

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| 86. Which best represents a homogeneous mixture of an element and a compound?

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

|  |  |
| --- | --- |
| *ANSWER:* | e |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-3 |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | mixture |
| *OTHER:* | Conceptual |
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| 87. Which best represents a gaseous compound?

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

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-3 |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | states of matter |
| *OTHER:* | Conceptual |
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| 88. Which best represents a solid element?

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

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-3 |
| *KEYWORDS:* | Chemistry | element | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 89. Which best represents a heterogeneous mixture of two elements?

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

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | False |
| *PREFACE NAME:* | Ref 1-3 |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | mixture |
| *OTHER:* | Conceptual |
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| 90. All physical changes are accompanied by chemical changes.

|  |  |  |
| --- | --- | --- |
|   | a.  | True |
|   | b.  | False |

|  |  |
| --- | --- |
| *ANSWER:* | False |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | True / False |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 91. Color changes always indicate a chemical change.

|  |  |  |
| --- | --- | --- |
|   | a.  | True |
|   | b.  | False |

|  |  |
| --- | --- |
| *ANSWER:* | False |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | True / False |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter |
| *OTHER:* | Conceptual |
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| 92. What are the components of the scientific method?

|  |  |
| --- | --- |
| *ANSWER:* | 1) Making observations (collecting data)2) Suggesting a possible explanation (formulating a hypothesis)3) Doing experiments to test the possible explanation (testing the hypothesis)Depending on the data from the experiments, the hypothesis may be modified and retested.See Sec. 1.2 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.2 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | scientific method |
| *OTHER:* | Conceptual |
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| 93. Garfield (weighing 24 lbs) took a flight to the moon on the space shuttle. As usual, he stuffed himself with lasagna during the entire flight and napped when he wasn't eating. Much to his delight when he got to the moon he found he weighed only 6 lbs. He immediately proclaimed a quick weight loss diet. Explain the fallacy in his reasoning. Assume gravity on the moon to be about one-sixth that of Earth.

|  |  |
| --- | --- |
| *ANSWER:* | Garfield (the cartoon cat) may have a different weight on the moon, but he has the same mass. He has apparently forgotten that weight is the response of mass to gravity, and since the moon has a smaller gravitational field his weight there is less.See Sec. 1.3 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | mass | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 94. Contrast the terms precision and accuracy.

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| *ANSWER:* | Precision refers to the agreement among several measurements of the same quantity.Accuracy refers to the agreement of a measurement with the true value.Measurements may often be precise without being accurate.See Sec. 1.4 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.4 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
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| 95. What data would you need to estimate the money you would spend on gas to drive your car from Los Angeles to Chicago? Provide a sample calculation.

|  |  |
| --- | --- |
| *ANSWER:* | Data would include: average price per gallon of gasoline, average MPG of the car, mileage of trip. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
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| 96. On a new temperature scale (°Y), water boils at 155.0°Y and freezes at 0.00°Y. Calculate the normal human body temperature using this temperature scale. On the Fahrenheit scale, normal human body temperature is 98.6°F, and water boils at 212.0°F and freezes at 32.0°F.

|  |  |
| --- | --- |
| *ANSWER:* | 57.3°YThe formula derived from the data is Y=(155/180)(F-32). |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Difficult |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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| 97. Explain how Archimedes might have used the concept of density to determine whether the king's crown was pure gold. (density of gold = 19.32 g/cm3)

|  |  |
| --- | --- |
| *ANSWER:* | If the density of gold was known to Archimedes, he could weigh the crown to determine its mass and then submerge the crown in water to measure the volume by displacement. By comparing the density of the crown calculated from this data to the known density of gold, he could find out if the crown was made of gold.Archimedes' Principle is slightly different, and not specifically addressed in this text.See Sec. 1.8 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.9 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | density | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 98. Explain the main differences between a compound and a mixture.

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| *ANSWER:* | A mixture may be separated into pure substances by physical means, while a compound requires chemical means to separate it into elements.A compound has constant composition (always the same ratio of elements), while a mixture may have varying composition.See Sec. 1.10 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | compound; mixture | general chemistry | general concepts | matter |
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| 99. Give three physical methods used by chemists to separate mixtures and identify the type of mixture best suited for each process.

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| *ANSWER:* | Three common methods are distillation, filtration, and chromatography.Distillation is useful for mixtures of volatile liquids (or mixtures of gases that can be condensed).Filtration is useful to separate a mixture of a solid and a liquid.Chromatography may be used for mixtures of volatile substances (gas chromatography) or soluble substances (paper chromatography).See Sec. 1.10 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Moderate |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | mixture |
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| 100. Name three methods for the separation of mixtures.

|  |  |
| --- | --- |
| *ANSWER:* | Three common methods are distillation, filtration, and chromatography.See Sec. 1.10 of Zumdahl, *Chemistry*. |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Subjective Short Answer |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | mixture |
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| 101. How many significant figures are in 0.00110

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

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 102. Which of the following unit factors is incorrect?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1 microliter/1000 nL |
|   | b.  | 1 cg/100 g |
|   | c.  | 1 L/1000 mL |
|   | d.  | 1000 m/1 km |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 103. Which of the following is not a fundamental metric unit?

|  |  |  |
| --- | --- | --- |
|   | a.  | meter |
|   | b.  | second |
|   | c.  | gram |
|   | d.  | mole |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | base unit | Chemistry | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 104. Which of the following is not a fundamental metric unit?

|  |  |  |
| --- | --- | --- |
|   | a.  | meter |
|   | b.  | second |
|   | c.  | kilogram |
|   | d.  | liter |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | base unit | Chemistry | general chemistry | general concepts | measurement | SI unit |
| *OTHER:* | Conceptual |
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| 105. Which of the following has a different value on the moon compared to earth?

|  |  |  |
| --- | --- | --- |
|   | a.  | mass |
|   | b.  | weight |
|   | c.  | time |
|   | d.  | moles |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.3 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement |
| *OTHER:* | Conceptual |
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| 106. How should the number 1.230 x 103 be properly expressed as a decimal?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1230 |
|   | b.  | 0.001230 |
|   | c.  | 1230.0 |
|   | d.  | 1230. |

|  |  |
| --- | --- |
| *ANSWER:* | d |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | scientific notation | significant figures |
| *OTHER:* | Conceptual |
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| 107. Calculate 5.1234 + 0.033 ÷ 1.650 and report to the correct number of significant figures.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3.1 |
|   | b.  | 3.125 |
|   | c.  | 5.143 |
|   | d.  | 5.1 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Quantitative |
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| 108. When 87.7 is added to 73.841, the result should be reported with  \_\_\_\_\_ significant figures.  And when 87.7 is divided by 73.841 the result should be reported with \_\_\_\_\_\_ significant figures.

|  |  |  |
| --- | --- | --- |
|   | a.  | 3,3 |
|   | b.  | 3,5 |
|   | c.  | 4,3 |
|   | d.  | 4,4 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.5 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | significant figures |
| *OTHER:* | Conceptual |
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| 109. A wavelength of red light is measured at 655 nm.  What is this measurement in cm?

|  |  |  |
| --- | --- | --- |
|   | a.  | 6.55 cm |
|   | b.  | 0.00655 cm |
|   | c.  | 6.55 x 10-5 cm |
|   | d.  | 6.55 x 10-7 cm |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.7 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | dimensional analysis | general chemistry | general concepts | measurement |
| *OTHER:* | Quantitative |
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| 110. Which separation technique is based on differences in the volatility of the substances to be separated?

|  |  |  |
| --- | --- | --- |
|   | a.  | filtration |
|   | b.  | distillation |
|   | c.  | solvent extraction |
|   | d.  | paper chromatography |

|  |  |
| --- | --- |
| *ANSWER:* | b |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.1 |
| *QUESTION TYPE:* | Multiple Choice |
| *HAS VARIABLES:* | False |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | matter | separation |
| *OTHER:* | Conceptual |
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| 111. Convert: –30.8°C = \_\_\_\_\_\_\_\_\_\_\_\_ °F.

|  |  |  |
| --- | --- | --- |
|   | a.  | -55.4°F |
|   | b.  | -87°F |
|   | c.  | -23.4°F |
|   | d.  | 87°F |
|   | e.  | 242.2 |

|  |  |
| --- | --- |
| *ANSWER:* | c |
| *POINTS:* | 1 |
| *DIFFICULTY:* | Easy |
| *REFERENCES:* | 1.8 |
| *QUESTION TYPE:* | Multi-Mode (Multiple choice) |
| *HAS VARIABLES:* | True |
| *KEYWORDS:* | Chemistry | general chemistry | general concepts | measurement | SI unit | temperature |
| *OTHER:* | Quantitative |
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