Exam  
  
Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.** | | |
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| 1) | Who is generally considered to be the founder of modern chemistry? |  |

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|  | A)  Antoine Lavoisier |
|  | B)  Robert Boyle |
|  | C)  Aristotle |
|  | D)  John Dalton |
|  | E)  none of the above |

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| 2) | Which of the following is a basic step in the scientific method? |  |

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|  | A)  analyze experimental data and propose a hypothesis |
|  | B)  test a hypothesis and state a theory or law |
|  | C)  perform an experiment and collect data |
|  | D)  all of the above |
|  | E)  none of the above |

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| 3) | Which of the following is a positive association with the study of chemistry? |  |

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|  | A)  Chemistry offers career opportunities. |
|  | B)  Chemistry has biomedical applications. |
|  | C)  Chemistry is relevant to our daily lives. |
|  | D)  Chemistry benefits society. |
|  | E)  all of the above |

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| 4) | Which of the following is a branch of chemistry? |  |

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|  | A)  inorganic chemistry |
|  | B)  biochemistry |
|  | C)  organic chemistry |
|  | D)  all of the above |
|  | E)  none of the above |

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| 5) | Which of the following professions requires a knowledge of chemistry? |  |

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|  | A)  sports trainer |
|  | B)  nurse |
|  | C)  pharmacist |
|  | D)  dentist |
|  | E)  all of the above |
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| 6) | What is the term for the gravitational force of attraction between an object and Earth? |  |

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|  | A)  volume |
|  | B)  weight |
|  | C)  mass |
|  | D)  length |
|  | E)  none of the above |
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| 7) | How many minutes are required for sunlight to travel from the Sun to Mars? (Assume the Sun is 2.28 × 108 km from Mars and that sunlight travels at 2.99 × 105 km per second.) |  |

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|  | A)  12.7 minutes |
|  | B)  45,800 minutes |
|  | C)  0.0787 minutes |
|  | D)  0.00131 minutes |
|  | E)  763 minutes |
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| 8) | Round off the following measurement to three significant digits: 14,546 cm. |  |

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|  | A)  14,600 cm |
|  | B)  15,000 cm |
|  | C)  145 cm |
|  | D)  146 cm |
|  | E)  14,500 cm |
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| 9) | Divide 6.41 × 10-3 by 8.04 × 107 and express the answer in scientific notation. |  |

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|  | A)  7.97 × 10-12 |
|  | B)  7.97 × 105 |
|  | C)  7.97 × 10-10 |
|  | D)  7.97 × 103 |
|  | E)  7.97 × 10-11 |
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| 10) | What is the average speed in feet per second of a world-class swimmer who swims a 400.0-m freestyle race in 3 min, 49.05 s? (Given: 1 m = 3.281 ft.) |  |

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|  | A)  5.730 ft/s |
|  | B)  114.6 ft/s |
|  | C)  1.746 ft/s |
|  | D)  0.5323 ft/s |
|  | E)  376.0 ft/s |
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| 11) | A ruby gemstone contains 52.7% aluminum, 47.1% oxygen, and small traces of chromium. If the ruby were found to contain 0.125 g of aluminum, what is the mass of the gemstone? |  |

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|  | A)  0.125 g |
|  | B)  0.237 g |
|  | C)  0.625 g |
|  | D)  0.265 g |
|  | E)  0.0659 g |

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| 12) | If a patient is injected with 375 milliliters of IV glucose, what is the volume in fluid ounces? (Given: 1 fluid ounce = 29.6 milliliters) |  |

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|  | A)  0.0789 fluid ounces |
|  | B)  375 fluid ounces |
|  | C)  29.6 fluid ounces |
|  | D)  12.7 fluid ounces |
|  | E)  11,100 fluid ounces |

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| 13) | Which of the following terms refers to the flow of energy from an object at a higher temperature to an object at a lower temperature? |  |

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|  | A)  calorie |
|  | B)  specific heat |
|  | C)  heat |
|  | D)  joule |
|  | E)  none of the above |

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| 14) | What is the term for the technique of determining the volume of a solid or a gas by measuring the volume of water it displaces? |  |

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|  | A)  volume by immersion |
|  | B)  volume by calculation |
|  | C)  volume by difference |
|  | D)  volume by displacement |
|  | E)  none of the above |

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| 15) | What is the three-step sequence in applying the unit analysis method of problem solving? |  |

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|  | A)  1-unit factor, 2-unknown unit, 3-relevant given value |
|  | B)  1-unit factor, 2-relevant given value, 3-unknown unit |
|  | C)  1-unknown unit, 2-relevant given value, 3-unit factor |
|  | D)  1-unknown unit, 2-unit factor, 3-relevant given value |
|  | E)  1-relevant given value, 2-unknown unit, 3-unit factor |
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| 16) | If a computer chip switches off-on-off in 0.015 μs, what is the switching time in ns? |  |

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|  | A)  0.000 000 015 ns |
|  | B)  15,000 ns |
|  | C)  0.000 015 ns |
|  | D)  15 ns |
|  | E)  none of the above |
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| 17) | If a chemistry student weighs 155 lb, what is the mass in kilograms? (1lb = 454g) |  |

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|  | A)  0.394 kg |
|  | B)  70,400 kg |
|  | C)  341 kg |
|  | D)  70.4 kg |
|  | E)  0.341 kg |

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| 18) | If a rectangular brass block measures 3.80 cm by 2.55 cm by 1.25 cm, what is the volume of the brass solid? |  |

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|  | A)  7.75 cm3 |
|  | B)  0.0826 cm3 |
|  | C)  12.1 cm3 |
|  | D)  1.19 cm3 |
|  | E)  1.86 cm3 |

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| 19) | If an automobile engine has a displacement of 155 in.3, what is the volume in cm3? |  |

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|  | A)  61.0 cm3 |
|  | B)  1000 cm3 |
|  | C)  9.45 cm3 |
|  | D)  2540 cm3 |
|  | E)  394 cm3 |

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| 20) | A 1.75 g sample of baking soda is heated and releases carbon dioxide gas into a 1000-mL flask. If the flask initially contains 752 mL of water and 305 mL remain after the gas has displaced a portion of the water, what is the volume of the gas? |  |

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|  | A)  248 mL |
|  | B)  752 mL |
|  | C)  447 mL |
|  | D)  695 mL |
|  | E)  305 mL |
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| 21) | A glass cylinder contains four liquid layers: mercury (*d* = 13.6 g/mL), chloroform (*d* = 1.49 g/mL), water (*d* = 1.00 g/mL), and ether (*d* = 0.708 g/mL). If an ice cube (*d* = 0.92 g/mL) is dropped into the cylinder, where does it come to rest? |  |

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|  | A)  on top of the ether layer |
|  | B)  on top of the water layer |
|  | C)  on top of the chloroform layer |
|  | D)  on top of the mercury layer |
|  | E)  on the bottom of the cylinder |

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| 22) | What are the freezing point and boiling point of water on the Kelvin scale? |  |

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|  | A)  0 K and 273 K |
|  | B)  100 K and 273 K |
|  | C)  100 K and 373 K |
|  | D)  0 K and 100 K |
|  | E)  273 K and 373 K |

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| 23) | Aluminum melts at 1220 °F. What is the melting point on the Celsius scale? |  |

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|  | A)  2164 °C |
|  | B)  696 °C |
|  | C)  660 °C |
|  | D)  2138 °C |
|  | E)  646 °C |

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| 24) | Fort Knox has 4700 Mg of gold. What is the mass in tons (1 ton = 1000 kg)? |  |

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|  | A)  470 ton |
|  | B)  47 ton |
|  | C)  4700 ton |
|  | D)  470,000 ton |
|  | E)  47,000 ton |

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| 25) | In performing a multistep calculation, when should you round off the answer in the calculator display? |  |

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|  | A)  after the second unit factor |
|  | B)  after the first unit factor |
|  | C)  after each step in the calculation |
|  | D)  after the final calculation |
|  | E)  none of the above |

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| 26) | What is the term for a pure substance that can be broken down into two or more substances by chemical reaction? |  |

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|  | A)  matter |
|  | B)  compound |
|  | C)  homogeneous |
|  | D)  element |
|  | E)  none of the above |

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| 27) | Which of the following laws states that mass cannot be created or destroyed? |  |

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|  | A)  law of conservation of energy |
|  | B)  law of conservation of mass |
|  | C)  law of definite composition |
|  | D)  law of conservation of mass and energy |
|  | E)  none of the above |

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| 28) | If 0.230 g of sodium metal reacts with 0.355 g of chlorine gas, what is the mass of sodium chloride produced? |  |

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|  | A)  0.125 g |
|  | B)  0.230 g |
|  | C)  0.585 g |
|  | D)  0.355 g |
|  | E)  impossible to predict from the given information |