Exam

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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  |