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Chapter 01

1. Which options do not relate to the importance of critical materials?
   a. Possess unique chemical and physical properties
   b. Are vital important to industries
   c. May be vulnerable to disruptions in their availability
   d. Are never vulnerable to disruptions in their availability

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Remember
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2. Lithium is categorized as the lightest metal on Earth and is commonly used in rechargeable batteries. It is categorized as a critical material.
   a. True
   b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Understand
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3. Which of the materials is considered critical material and plays a vital role in technology? (Multiple Choices may apply.)
   a. Nickel
   b. Uranium
   c. Silicon
   d. Cobalt

ANSWER:	a, d
POINTS:	1
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Response
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Analyze
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4. What do the things we can see about substances and their reactions provide?
   a. The particulate perspective
   b. The macroscopic perspective
   c. The symbolic perspective
   d. The microscopic perspective

ANSWER:	b
POINTS:	1
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
KEYWORDS:	Bloom's: Remember
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5. One of the most common ways to observe matter is to allow it to change in some way. What are the two types of changes that can be distinguished? Multiple answers may apply.
   a. Physical properties
   b. Chemical properties
   c. Intensive properties
   d. Extensive properties

ANSWER:	a, b
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Response
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
KEYWORDS:	Bloom's: Apply
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6. According to the macroscopic understanding, chemical properties are associated with the types of chemical changes that a substance undergoes. For example, some materials burn readily, whereas others do not.
   a. True
   b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
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7. From the macroscopic perspective, what do physical properties represent?
   a. A ratio of mass and volume
   b. Types of chemical changes that a substance undergoes
   c. Variables we can measure without changing the identity of the substance being observed
   d. How atoms are held together in a molecule

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
KEYWORDS:	Bloom's: Understand
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8. What are the reasons scientists create models and theories? Select all that apply.
   a. Summarizing many observations concisely
   b. Predicting behavior in circumstances that we haven't previously encountered
   c. Leading us ultimately to a less fundamental understanding of a problem
   d. Representing examples of creative thinking and problem solving

ANSWER:	a, b, d
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Response
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.3 - Explain how scientists create models and theories to organize and explain observational data
TOPICS:	A-head: Observations, Models, and Systems
KEYWORDS:	Bloom's: Analyze
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9. To organize the vast amount of information, scientists create models and theories to make sense of a range of observations. Models are developed using which type of process?
   a. Scientific theory
   b. Scientific method
   c. Scientific model
   d. Scientific law

ANSWER:	b
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.3 - Explain how scientists create models and theories to organize and explain observational data
TOPICS:	A-head: Observations, Models, and Systems
KEYWORDS:	Bloom's: Understand
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10. The theories and models are supported by one experimental measurement.

    a. True
    b. False

ANSWER:	False
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.3 - Explain how scientists create models and theories to organize and explain observational data
TOPICS:	A-head: Observations, Models, and Systems
KEYWORDS:	Bloom's: Remember
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11. What is SI unit for energy?
    a. J
    b. kg /m^2 s
    c. kg m^2 s^{-2}
    d. kg m^2

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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12. The distance of 0.0000000001 meters could be reported as:
    a. 1 nm
    b. 0.1 nm
    c. 0.01 nm
    d. 0.001 nm

ANSWER:	b
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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13. If we convert 3.84 ppm into ppb, what value do we get?
    a. 348 ppb
    b. 3,840,000 ppb
    c. 389 ppb
    d. 3,840 ppb

ANSWER:	d
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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14. What is the key difference between inductive and deductive reasoning?
    a. Inductive reasoning generalizes from observations, while deductive reasoning draws conclusions from given statements.
    b. Inductive reasoning is used only when all scenarios are tested, while deductive reasoning requires no testing.
    c. Deductive reasoning predicts outcomes from observations, while inductive reasoning follows strict logic.
    d. Inductive reasoning always gives correct conclusions, while deductive reasoning is uncertain.

ANSWER:	a
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.3 - Explain how scientists create models and theories to organize and explain observational data
TOPICS:	A-head: Observations, Models, and Systems
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15. How many significant figures are present in 0.002 m?
    a. 4
    b. 3
    c. 2
    d. 1

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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16. How many significant figures are present in 0.403 s?
    a. 1
    b. 2
    c. 3
    d. 4

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Understand
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17. Assuming the numbers given are measurements, after we carry out the indicated arithmetic operations, what is the answer with the correct number of significant figures in 18.13 – 1.3?
    a. 16.8
    b. 16.83
    c. 16
    d. 16.830

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Understand
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18. If the cost to fill a gasoline tank is $85.2 and gasoline costs $3.75/gal, how many liters can the tank hold (1 gallon = 3.785 liters)?
    a. 85.9
    b. 86.0
    c. 6.00
    d. 6.26

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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19. The distance between two atoms in a molecule is 142 pm. What is this distance in meters?

    a. $1.42 * 10^{-12}$

    b. $1.42 * 10^{-11}$

    c. $1.42 * 10^{-10}$

    d. $1.42 * 10^{-13}$

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Remember
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20. A metallic cylinder displaces 85.5 mL and has a mass of 230.3 g. What is the density of the metal?

    a. 9.65 g/mL

    b. 1.37 g/mL

    c. 2.70 g/mL

    d. 2.69 g/mL

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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21. If we consider orange light with a wavelength of 615 nm, what will the wavelength in meters be?

    a. 6.15×10^{-7}

    b. 6.15×10^{-8}

    c. 6.15×10^{-9}

    d. 6.15×10^{-10}

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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22. Measurements indicate that 21.8% of the residents of a city with a population of 478,526 are college graduates. How many college graduates are estimated to reside in this city?

    a. 1.04×10^{4}

    b. 1.04×10^{-5}

    c. 1.04×10^{5}

    d. 1.04×10^{6}

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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23. A rock is placed on a balance and its mass is determined to be 25.32 g. When the same rock is placed in a graduated cylinder that originally contained 13.25 mL of water, the new volume of water is 19.96 mL. What should the density of the rock be reported as?
    a. 3.53 g/mL
    b. 3.50 g/mL
    c. 3.7734 g/mL
    d. 3.77 g/mL

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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24. Which is the converting ratio between mL and L?
    a. 1000 mL/1 L
    b. 100 mL/1L
    c. 1L/100 mL
    d. 1L/10 mL

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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25. Why is a strong, transparent outer layer important for ITO thin layers in consumer products?
    a. Because ITO layers are brittle and need protection to ensure durability.
    b. Because the outer layer enhances the electrical conductivity of ITO.
    c. Because ITO layers absorb too much light without an outer coating.
    d. Because the outer layer increases the checkerboard pattern's visibility.

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Understand
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26. A typical touchscreen display consists of several stacked layers. The LCD screen at the bottom of the stack produces the image. Two thin, transparent layers of indium tin oxide (ITO) are separated by
    a. a transparent non-insulating layer.
    b. a nontransparent insulating layer.
    c. a transparent insulating layer.
    d. two transparent insulating layers.

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Analyze
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27. The utility of indium tin oxide arises from two important features. First, it is an example of a doped semiconductor, which is needed for the current to be detectable. Second, it is optically transparent; it doesn't interfere with the light that is going through the touchscreen.

    a. True

    b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Understand
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28. When combined with the need to make a reliable touchscreen consumer product, it’s very important to have a strong and optically transparent outermost layer. Which would be the logical candidate materials for this task? More than one answer may apply.

    a. Some sort of glass

    b. A paper bag

    c. A plastic

    d. Some combination of paper and plastic

ANSWER:	a, c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Response
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Understand
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29. What does a symbolic representation help us do? More than one answer may apply.
    a. Represents the atoms
    b. Represents the reactions that make up science
    c. Represents the name of the substance
    d. Represents the molecules

ANSWER:	a, b, d
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Response
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
KEYWORDS:	Bloom's: Apply
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30. Which of the options does not represent a level of understanding or perspective on the nature of chemistry?
    a. Macroscopic perspective
    b. Symbolic perspective
    c. Particulate perspective
    d. Matter perspective

ANSWER:	d
POINTS:	2
DIFFICULTY:	Moderate
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.2 - Explain how the macroscopic, particulate, and symbolic perspectives contribute to understanding chemical systems
TOPICS:	A-head: Multiple Perspectives in Chemistry
KEYWORDS:	Bloom's: Analyze
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31. Which of the options represents an SI unit for mass?
    a. Pound
    b. Ounce
    c. Kilogram
    d. Gram

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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32. A kilobyte, familiar in computer technology, represents how many bytes?
    a. 10
    b. 10000
    c. 100
    d. 1000

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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33. A metal block has a mass of 237.5 g and a volume of 19.3 cm³. Calculate the density of the metal, and express the answer with the correct number of significant figures and appropriate units.

    a. 12.31 g/cm^3

    b. 12.3 g/cm^3

    c. 0.08 g/cm^3

    d. 0.0812 g/cm^3

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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34. Let's say your grocery bill indicates that you paid $4.89 for a 3.0-pound bag of apples. How much did you pay per pound?

    a. $1.6

    b. $1.63

    c. $1.36

    d. $1.73

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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35. Suppose that your supermarket is offering 20-count shrimp for $8.99 per pound. How much should you expect to pay for one dozen shrimp?

    a. $5.28

    b. $5.39

    c. $5.2

    d. $5.4

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.4 - Express measurements with appropriate units and the results of calculations using the correct number of significant figures
TOPICS:	A-head: Numbers and Measurements in Chemistry
KEYWORDS:	Bloom's: Apply
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36. Large amounts of electrical power, measured in watts (W), are used to produce aluminum from ore. If a production plant uses 4.3 GW in a certain period, there are 4.3 x 10 8 watts used.

    a. True

    b. False

ANSWER:	False
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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37. The mass density of water at 30°C is 0.995 g per mL. A child's wading pool holds 412 L of water at this temperature. What mass of water is in the pool?

    a. 4.09×10^{5}

    b. 4.10×10^{5}

    c. 4.09×10^{-5}

    d. 4.10×10^{-5}

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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38. 43 kg is greater than 4300 g.

    a. True

    b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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39. What is the mass of a 120-lb person in grams?
    a. 54,000 grams
    b. 54,400 grams
    c. 54,432 grams
    d. 55,000 grams

ANSWER:	a
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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40. How many feet are there in 1.0 meter?
    a. 2
    b. 2.8
    c. 3
    d. 3.1

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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41. The temperature in New York City is 68 degrees Fahrenheit. What is the temperature in Celsius?
    a. 19
    b. 20
    c. 21
    d. 22

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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42. When we convert 500 meters to kilometers, the result will be 0.05.
    a. True
    b. False

ANSWER:	False
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
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43. What is the conversion factor for kilograms to grams?
    a. 100 g/1 kg
    b. 1000 g/1 kg
    c. 10 g/1 kg
    d. 10,000 g/1 kg

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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44. A shape has a volume of 2.70 m^3. What is its volume in cm^3?
    a. 2.70 x 10^2 cm^3
    b. 2.70 x 10^4 cm^3
    c. 2.70 x 10^5 cm^3
    d. 2.70 x 10^6 cm^3

ANSWER:	d
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
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45. When we convert 777 meters (m) to centimeters (cm) we get 70 cm.
    a. True
    b. False

ANSWER:	False
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.5 - Use appropriate techniques to convert measurements from one unit to another
TOPICS:	A-head: Problem Solving in Chemistry and Engineering
KEYWORDS:	Bloom's: Apply
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46. ITO thin layers are most often made by a process called vapor deposition, where indium oxide and tin oxide vapors condense on a surface to grow the material. A typical ITO thin layer has roughly 90% indium oxide and 10% tin oxide.
    a. True
    b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Understand
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47. Gorilla® Glass is a popular material that starts as aluminosilicate glass, like many other types of glass. What makes it resistant to breaking is that it is treated in a second process called ion exchange. What gets exchanged in this process?

    a. Potassium replaces some of the iron in the glass.

    b. Potassium replaces some of the lithium in the glass.

    c. Potassium replaces some of the sodium in the glass.

    d. Potassium replaces some of the carbon in the glass.

ANSWER:	c
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.6 - Identify how engineers incorporate different materials in a consumer product, such as the touchscreen of a smartphone
TOPICS:	A-head: Touchscreen Technology
KEYWORDS:	Bloom's: Understand
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48. Iron, steel, copper, nickel, lead, and zinc were materials that were vitally important to the advances of the early industrial revolution, and they remain important economic commodities today.

    a. True

    b. False

ANSWER:	True
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Understand
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49. Cobalt is considered as a “critical material” largely because of its use in lithium batteries, which power many of our devices.
    a. True
    b. False

ANSWER:	False
POINTS:	1
DIFFICULTY:	Easy
QUESTION TYPE:	True / False
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Understand
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50. Gallium, magnesium, and cobalt are categorized as:
    a. Noncritical materials
    b. Critical material
    c. Important materials
    d. Easy-to-use materials

ANSWER:	b
POINTS:	2
DIFFICULTY:	Easy
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	False
LEARNING OBJECTIVES:	LO1.1 - Explain how critical materials are important to the national and global economies
TOPICS:	A-head: Critical Materials
KEYWORDS:	Bloom's: Understand
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