CHAPTER 1 - MATTER AND ENERGY

Significant Figures, Units, And Conversions

1. What answer should be reported, with the correct number of significant figures, for the following calculation?

$$(433.621 - 333.9) \times 11.900 = ?$$

A. 1200
B. 1190
C. 1187
D. 1186.7
E. 1186.68

2. The mass of a sample is 550. milligrams. Which of the following expresses that mass in kilograms?
A. 5.50×10^{-6} kg
B. 5.50×10^{6} kg
C. 5.50×10^{5} kg
D. 5.50×10^{-1} kg
E. 5.50×10^{-4} kg

3. Convert 10.44 in^2 to cm^2.
A. 67.35 cm^2
B. 26.52 cm^2
C. 67.4 cm^2
D. 4.11 cm^2
E. 1.618 cm^2

4. A cyclist rides at an average speed of 24.0 miles per hour. If she wants to bike 195 km, how long (in hours) must she ride?
A. 0.198 hr
B. 2910 hr
C. 13.1 hr
D. 5.05 hr
E. 7530 hr

5. Convert 70.0 mi/hr to m/s
A. 0.356 m/s
B. 157 m/s
C. 31.3 m/s
D. 23.0 m/s
E. 15.3 m/s

6. Acetone (nail polish remover) has a density of 0.7857 g/mL. What is the volume, in L, of 354 g of acetone?
A. 0.278 L
B. 278 LL
C. 451 L
D. 0.451 L
E. none of the above

7. Convert 35.2°C to **K** and **ºF**.
A. 121°F, -238.0 K
B. 95.4°F, 368.6 K
C. 121°F, 308.4 K
D. 1.78°F, -238.0 K
E. 95.4°F, 308.4 K

8. When an irregularly shaped object weighing 8.763 g was placed in a graduated cylinder containing 25.00 mL of water, the water level in the cylinder rose to 28.76 mL. What is the density of the object in g/mL?
A. 0.429 g/mL
B. 32.95 g/mL
C. 3.282 g/mL
D. 2.331 g/mL
E. 2.33 g/mL

9. In the opening scenes of the movie *Raiders of the Lost Ark*, Indiana Jones tries to remove a gold idol from a booby-trapped pedestal by replacing the idol with a bag of sand of approximately equal volume. Assuming that the volume of the idol is 1.00 L, what volume of sand would be necessary to have the same weight as the idol? (The density of gold is 19.32 g/cm^3, and the density of sand is 2.00 g/cm^3. 1mL = 1 cm^3.)
A. 9.66 L
B. 104 L
C. 38,600 L
D. 9660 L
E. 38.6 L

10. Light travels at 3.00×10^{8} m/s. How many seconds does it take light to travel from the Sun to the Earth, a distance of approximately 93.0 million miles?
A. 3.22 s
B. 1.73×10^{13} s
C. 193 s
D. 310 s
E. 499 s

Classification of Matter

Directions for NEXT TWO Questions: Answer the following questions about the following list of substances:
    iron
    table salt (sodium chloride)
    spaghetti with meatballs
    Kool-Aid (mixture of sugar, food coloring, and water)

11. Which TWO of the substances listed above are pure substances?
    A. iron and table salt
    B. spaghetti and Kool-Aid
    C. spaghetti and iron
    D. iron and table salt
    E. iron is the only pure substance on the list

12. Which ONE of the substances listed above is a heterogeneous mixture?
    A. iron
    B. table salt
    C. spaghetti
    D. Kool-Aid
    E. none of the these are heterogeneous mixtures

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13. Which ONE of the following is a chemical process?
    A. The liquid propane in a gas grill burns in a flame.
    B. Salt (sodium chloride) dissolves in water.
    C. Ice melts to form liquid water.
    D. The liquid propane in a gas grill evaporates because the user left the valve open.
    E. All of the above are chemical processes.

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14. An **element** is
    A. a substance composed of two or more elements in fixed proportions that are chemically combined.
    B. a substance which consists of only one type of atom and cannot be broken down into simpler substances.
    C. a group of two or more substances which are physically intermingled in varying proportions.
    D. a structure consisting of two or more atoms that are chemically bound together and behave as an independent unit.
    E. a group of two or more substances in which the mixing is uniform, with no observable boundaries.