Project Advance Chemistry 106 Sample Questions
on Material in *General Chemistry*, Brown, LeMay, and Bursten, 6th ed.

Chapter 1. Introduction: Some Basic Concepts

1. Solids are characterized as having _____ shape which means they are _____.

    (a) definite, compressible   (b) definite, incompressible
    (c) indefinite, compressible   (d) indefinite, incompressible
    (e) none of these.

2. A term that relates to how well a particular measurement is able to be repeated is

    (a) qualitative   (b) precision
    (c) phase   (d) accuracy
    (e) quantitative.

3. The following is known about a sample of an element.

    I.   Its mass is 12.56 g
    II.   It conducts electricity.
    III. 0.325 calories will raise the temperature of 1 gram of it by 1°C.
    IV.   It is yellow.
    V.   Its oxide is easily decomposed when heated.

    Which of these are intensive properties?

    (a) I only.   (b) All of them.
    (c) II, IV, and V   (d) II, III, IV, and V
    (e) none of them.

4. Which one of the following is an extensive property?

    (a) density   (b) shape
    (c) boiling point   (d) freezing point
    (e) none of these.

5. The SI prefix meaning " $\times 10^{-12}$" is

    (a) micro   (b) nano
    (c) femto   (d) pico
    (e) none of these.

6. A substance has a mass of 3.0×10^6 nanograms. Expressed ins kilograms, this mass is

    (a) 3.0×10^{-6} kg   (b) 3.0×10^3 kg
    (c) 3.0×10^2 kg   (d) 3.0×10^{-1} kg
    (e) 3.0×10^{-9} kg

7. Temperature is commonly expressed in °F in the U.S.; however, the basic SI unit of temperature is

    (a) °C   (b) K
    (c) T   (d) t
    (e) °R

8. Convert 400 K to °F.

    (a) 261   (b) 286
    (c) 88   (d) 103
    (e) none of these.

9. A sample of metal was heated from 27°C to 45°C. The temperature change, expressed in kelvins, is

    (a) 273 K   (b) 18 K
    (c) 300 K   (d) 318 K
    (e) impossible to determine without more information.

10. Room temperature is approximately 20°C. What is this temperature in °F?

    (a) 77°F   (b) 68°F
    (c) 72°F   (d) 75°F
    (e) 65°F

11. When the following arithmetic is performed on these experimentally determined values, how many significant figures should be reported in the answer?

    $(31/45.20) + 14.000$

    (a) 6   (b) 2
    (c) 3   (d) 4
    (e) 5

12. The volume of a regular cylinder is given by the formula $V = \pi r^2 h$. Using the value 3.1416 for the constant π, the volume of a cylinder of radius 2.34 cm and height 19.91 cm expressed to the correct number of significant figures in cm^3 is

    (a) 342.49471   (b) 342.495
    (c) 342.49   (d) 343
    (e) 342

13. Round the number 0.07535 to two significant figures.

   (a)   0.08   (b)   0.076
   (c)   0.0754   (d)   0.075
   (e)   none of these.

14. How many times more expensive is buying a carbonated beverage in 12-oz cans at forty
     cents each relative to buying it in three-liter bottles at $1.49 cents each? (1.000
     L = 1.057 qt; 1 qt = 32 oz).

   (a)   1.33   (b)   2.27
   (c)   2.54   (d)   2.89
   (e)   3.72

15. Which of the following is the same as 0.001 cm?

   (a)   0.01 mm   (b)   0.01 dm
   (c)   0.01 m   (d)   100 mm
   (e)   none of these.

16. The barometric pressure in the eye of a hurrican sometimes dips as low as 27.2 inches of
     mercury. How many millimeters of mercury is this?

   (a)   1.1   (b)   6.9
   (c)   691   (d)   107
   (e)   none of these.

17. A particular diet claims a weight loss of 3 pounds/week. how many grams/day would this
     be?

   (a) $\dfrac{(3)\,(7)}{453.6}$ (b) $\dfrac{(7)\,(453.}{3}$

   (c) $\dfrac{(3)\,(453.}{7}$ (d) $\dfrac{(453.6)}{(3)\,(7)}$

   (e)   none of these.

18. Zinc has a density of 446 lb/ft^3. What is the density of zinc in g/cm^3?

   (a)   7.14   (b)   0.0323
   (c)   6.64 × 10^3 (d)   3.65
   (e)   none of these.

19. The density of magnesium is 1.74 g/cm^3. What is the mass of a magnesium block that
     measures 2.5 cm X 3.5 cm X 1.5 cm?
     (a)   48 g   (b)   23 g
     (c)   12 g   (d)   7.5 g
     (e)   none of these.

20. At 20°C the density of methanol, CH_3OH, is 0.791 g$\cdot$cm^{-3}. If a laboratory worker needs
     215 g of methanol for an experiment, how many liters should be used?
     (a)   0.170 L   (b)   0.272 L
     (c)   0.544 L   (d)   0.870 L
     (e)   None of these.

21. Water has a density of 8.34 lb/gal. If the specific gravity of mercury is 13.5, what would
     be the mass, in pounds, of 1.00 gal of mercury?
     (a)   21.8 lb   (b)   13.5 lb
     (c)   8.34 lb   (d)   1.62 lb
     (e)   113 lb

22. In the scientific method, a statement that correlates or summarizes a large amount of
     experimental date is called
     (a)   an observation   (b)   a theory
     (c)   a law   (d)   a hypothesis
     (e)   none of the other choices correctly completes the statement.

23. A quantity x is calculated from the equation $x = a/(b \cdot c)$.
     If the units of a are $g \cdot cm^2 \cdot s^2$, the units of b are g, and the units of c are cm, what are the
     units of x?

     (a)   cm^2/(g$\cdot$s)   (b)   cm/s^2
     (c)   g$\cdot$cm^3/s^2 (d)   cm^2/s^2
     (e)   s/(g$\cdot$cm)

24. The number 215×10^{116} can also be written as

     (a) 0.215×10^{119} (b) 2.15×10^{113}
     (c) 2.15×10^{114} (d) 2150×10^{117}
     (e) 21.5×10^{118}

25. A monolayer of oleic acid has mass of 3.20×10^{-6} g and an area of 20.0 cm^2. The
     density of oleic acid is 0.895 g/mL. What is the thickness of the monolayer?

     (a) 2.86×10^{-6} cm   (b) 3.58×10^{-6} cm

     (c) 5.59×10^{-6} cm   (d) 1.79×10^{-7} cm

     (e) 1.43×10^{-7} cm