Chemistry
Practice Quiz: Units & Density

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) Numbers are usually written so that the uncertainty is in the last reported digit.

2) Zeros located between two numbers are not significant.

3) Zeros located after a number and after a decimal point are significant.

4) Exact numbers have an unlimited number of significant figures.

5) Trailing zeros before a decimal point but after a non-zero number are considered significant figures.

6) When the number 65.59 is rounded to contain 2 significant figures, it becomes 66.0.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

7) What is the term for the certain digits in a measurement plus one estimated digit?

A) significant digits B) nonsignificant digits
C) instrumental digits D) certain digits E) none of the above

8) If a 20.0 mL test tube measures 15.0 cm, what is the length in meters?

A) 1500 m B) 0.150 m C) 1.50 m D) 15.0 m E) none of the above

9) The correct scientific notation for the number 0.00050210 is:

A) 5.021×10^{4} B) 5.021×10^{-4} C) 5.0210×10^{4} D) 5.0210×10^{-4} E) none of the above

10) The wavelength of blue light is 0.00000045 m. Express this wavelength in scientific notation.

A) 4.5×10^{-6} m B) 4.5×10^{6} m C) 4.5×10^{-7} m D) 0.45×10^{-7} m E) 4.5×10^{7} m

11) The correct decimal representation of 6.453×10^{3} is:

A) 6.5×10^{3} B) 6,453 C) 6.453 D) 0.006453 E) none of the above

12) If a 10K race is 10.0 km, what is the distance in yards? (Given: 1 yd = 0.914 m)

A) 10,000 yd B) 0.0109 yd C) 10,900 yd D) 9140 yd E) 0.00914 yd

13) According to dimensional analysis, which of the following is a correct set-up for the problem, "How many millimeters are there in 12.8 feet?"

A) $12.8\ \text{ft}\left[\frac{12\ \text{in.}}{1\ \text{ft}}\right]\left[\frac{10\ \text{mm}}{1\ \text{in.}}\right]\left[\frac{10\ \text{cm}}{1\ \text{mm}}\right]$ B) $12.8\ \text{ft}\left[\frac{12\ \text{in.}}{1\ \text{ft}}\right]\left[\frac{2.54\ \text{cm}}{1\ \text{in.}}\right]\left[\frac{10\ \text{mm}}{1\ \text{cm}}\right]$

C) $12.8\ \text{ft}\left[\frac{25.4\ \text{mm}}{\text{ft}}\right]$ D) $12.8\ \text{ft}\left[\frac{10\ \text{mm}}{1\ \text{ft}}\right]$

14) The typical volume of an aluminum can of soda is 355 mL. What is the equivalent volume in gallons?

A) 5.75 gal B) 0.0938 gal C) 3.37×10^{5} gal D) 0.673 gal

15) Suppose a thermometer has marks at every one degree increment and the mercury level on the thermometer is exactly between the 25 and 26 degree Celsius marks. We should properly report the temperature measurement as:
A) 25.5°C B) 25°C C) 25.55°C D) 26°C E) 25.50°C

16) The correct number of significant figures in the number 865,000 is:
A) 3 B) 4 C) 6 D) ambiguous E) none of the above

17) The correct number of significant figures in the number 0.002320 is:
A) 4 B) 3 C) 7 D) ambiguous E) none of the above

18) Determine the answer to the following equation with correct number of significant figures:
$106 \div 9.02 \times 1.9 =$ _____
A) 22.32816 B) 22.328 C) 22 D) 22.3 E) none of the above

19) How many inches are in 6.32 cm?
A) 16.1 B) 2.49 C) 8.86 D) 3.78 E) none of the above

20) What is the density of 96 mL of a liquid that has a mass of 90.5 g?
A) 186.5 g/mL B) 28.4 g/mL C) 1.1 g/mL D) 0.94 g/mL E) none of the above

21) A nugget of gold with a mass of 521 g is added to 50.0 mL of water. The water level rises to a volume of 77.0 mL. What is the density of the gold?
A) 6.77 g/mL B) 19.3 g/mL C) 0.0518 g/mL D) 10.4 g/mL E) 1.00 g/mL

22) A lead ball has a mass of 55.0 grams and a density of 11.4 g/cm^3. What is the volume of the ball?
A) 0.207 L B) 0.207 mL C) 4.82 L D) 4.82 mL E) none of the above

23) What is the density (g/mL) of an object that has a mass of 14.01 grams and, when placed into a graduated cylinder, causes the water level to rise from 25.2 mL to 33.6 mL?
A) 0.60 B) 2.4 C) 1.7 D) 1.8 E) none of the above

24) A popular science demonstration is to take several liquids that will not mix together and "stack" these liquids in a tall glass cylinder. Suppose the following three liquids were placed in the same tall, narrow glass cylinder:

SUBSTANCE	DENSITY g/mL
vinegar	1.01
motor oil	0.87
corn syrup	1.36

These liquids would stack in which order?
A) corn syrup on top, motor oil in the middle, vinegar on the bottom
B) motor oil on top, vinegar in the middle, corn syrup on the bottom
C) motor oil on top, corn syrup in the middle, vinegar on the bottom
D) vinegar on top, motor oil in the middle, corn syrup on the bottom
E) corn syrup on top, vinegar in the middle, motor oil on the bottom

25) The Olympic Games shot put field event uses a 16 pound (lb) shot. Identify the correct solution map to convert from pounds to kilograms using prefix multipliers and the given conversions of $\frac{16\text{ oz}}{1\text{ lb}} = 1$ and $\frac{453.6\text{ g}}{16\text{ oz}} = 16$.

A) $16\text{ lb} \times \frac{16\text{ oz}}{1\text{ lb}} \times \frac{453.6\text{ g}}{16\text{ oz}} \times \frac{10^3\text{ kg}}{1\text{ g}}$

B) $16\text{ lb} \times \frac{16\text{ oz}}{1\text{ lb}} \times \frac{453.6\text{ g}}{16\text{ oz}} \times \frac{1\text{ kg}}{10^3\text{ g}}$

C) $16\text{ lb} \times \frac{1\text{ oz}}{16\text{ lb}} \times \frac{453.6\text{ g}}{16\text{ oz}} \times \frac{1\text{ kg}}{10^3\text{ g}}$

D) $16\text{ lb} \times \frac{1\text{ lb}}{16\text{ oz}} \times \frac{16\text{ oz}}{453.6\text{ g}} \times \frac{10^3\text{ g}}{1\text{ kg}}$

Written Questions

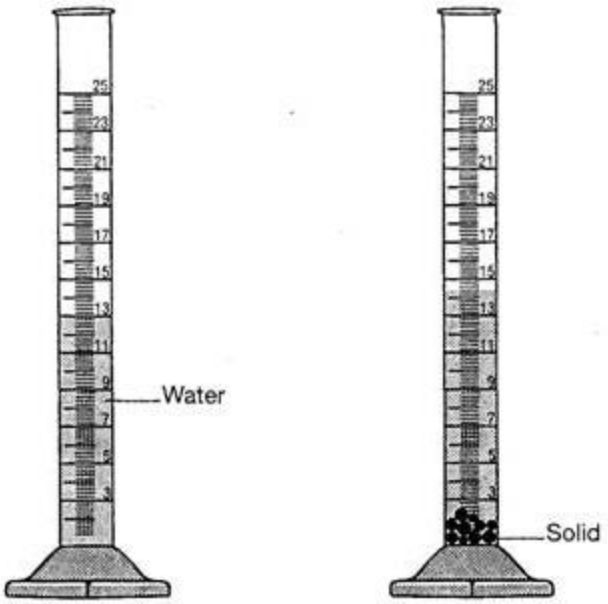
1 What is the difference between random and systematic error in measurements? Which is easier to account for when working with measurements in lab. Explain.

2 Write a simple procedure to find the density of an ice cube. What potential sources of error exist? List any assumptions that you will make.

3 What certain measurements are shown on our 25ml graduated cylinders (use in the sugar lab)? How did these affect your measurements?

4 A lab results in a yield of 0.413g of sugar, measured on an electronic balance. How many significant figures are given? How many of these are certain figures?

5 A density of solids lab is performed. The following volumes are observed for several solid pieces with a mass of 2.491g. Calculate the density.



Multiple choice answers

1) TRUE 2) FALSE 3) TRUE 4) TRUE 5) TRUE 6) FALSE 7) A
8) B 9) D 10) C 11) B 12) C 13) B 14) B 15) A 16) D 17) A 18) C 19) B 20) D
21) B 22) D 23) C 24) B 25) B