AP Chem Ch.1 Test

1. Which of the following is an example of a quantitative observation?
   A) The piece of metal is longer than the piece of wood.
   B) Solution 1 is much darker than solution 2.
   C) The liquid in beaker A is blue.
   D) The temperature of the liquid is 60°C.
   E) At least two of the above (A-D) are quantitative observations.

2. Which of the following metric relationships is incorrect?
   A) 1 microliter = 10^{-6} liters
   B) 1 gram = 10^{3} kilograms
   C) 10^{3} milliliters = 1 liter
   D) 1 gram = 10^{2} centigrams
   E) 10 decimeters = 1 meter

3. For which pair is the SI prefix not matched correctly with its meaning?
   A) $\text{mega} = 10^{6}$
   B) $\text{kilo} = 1000$
   C) $\text{deci} = 10$
   D) $\text{nano} = 10^{-9}$
   E) $\text{centi} = 0.01$

4. Order the four metric prefixes from smallest to largest.
   A) nano- < milli- < centi- < kilo-
   B) milli- < nano- < centi- < kilo-
   C) kilo- < centi- < nano- < milli-
   D) kilo- < centi- < milli- < nano-
   E) centi- < nano- < kilo- < milli-

5. Convert 0.3980 m to mm.
   A) 398.0 mm
   B) 3.980×10^{-3} mm
   C) 3.980×10^{-4} mm
   D) 0.03980 mm
   E) none of these

6. The degree of agreement among several measurements of the same quantity is called _____. It reflects the reproducibility of a given type of measurement.
   A) accuracy
   B) error
   C) precision
   D) significance
   E) certainty

7. As part of the calibration of a new laboratory balance, a 1.000-g mass is weighed with the following results:

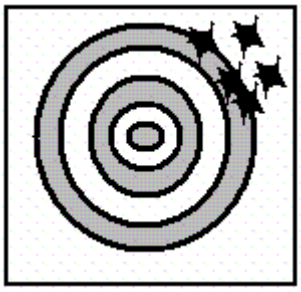
Trial	Mass
1	1.201 ± 0.001
2	1.202 ± 0.001
3	1.200 ± 0.001

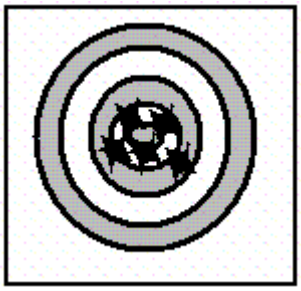
The balance is:

A) Both accurate and precise.
B) Accurate but imprecise.
C) Precise but inaccurate.
D) Both inaccurate and imprecise.
E) Accuracy and precision are impossible to determine with the available information.

Consider the following three archery targets:

I. 

II. 

III. 

8. Which of the following figure(s) represent a result having high precision?
A) Figure I only
B) Figure II only
C) Figure III only
D) Figure I and Figure II
E) Figure II and Figure III

9. A scientist obtains the number 0.045006700 on a calculator. If this number actually has four (4) significant figures, how should it be written?
A) 0.4567
B) 0.4501
C) 0.0450
D) 0.04500
E) 0.04501

10. Express the number 0.000333 in scientific notation.
A) 333×10^{-6}
B) 3.33×10^{2}
C) 3.33×10^{4}
D) 3.33×10^{-4}
E) 0.333×10^{-3}

11. Express the number 6.49×10^{-3} in common decimal form.
    A) 0.00649
    B) 6.49
    C) 6490
    D) 0.0649
    E) 0.000649

12. Consider the numbers 23.68 and 4.12. The sum of these numbers has ____ significant figures, and the product of these numbers has ____ significant figures.
    A) 3, 3
    B) 4, 4
    C) 3, 4
    D) 4, 3
    E) none of these

13. Using the rules of significant figures, calculate the following:

$$\frac{6.167 + 68}{5.10}$$

    A) 14.5
    B) 16
    C) 15
    D) 82
    E) 14.54

14. Convert 59.4 mi to km. (1 m = 1.094 yd, 1 mi = 1760 yd)
    A) 6.50×10^{1} km
    B) 3.69×10^{1} km
    C) 9.56×10^{7} km
    D) 5.43×10^{1} km
    E) 9.56×10^{1} km

15. 409 Kelvin equals
    A) 136°F
    B) 273°F
    C) 682°F
    D) 136°C
    E) 682°C

16. As warm water sits in a cool room, you measure the temperature change ($\Delta T = T_{final} - T_{initial}$). Which of the following is true?

A) The temperature change (ΔT) is bigger if you are measuring in °F.
B) The temperature change (ΔT) is bigger if you are measuring in °C.
C) The temperature change (ΔT) will be the same regardless of the scale you use.
D) Answer A or B is correct, depending on the difference in temperature between the water and the room.
E) None of the above.

17. In 1984, some drums of uranium hexafluoride were lost in the English Channel, which is known for its cold water (about 17°C). The melting point of uranium hexafluoride is 148°F. In what physical state is the uranium hexafluoride in these drums?

$$\left(T_{°F} = T_{°C} \times \left(\frac{9°F}{5°C} \right) + 32°F \right)$$

A) solid
B) liquid
C) gas
D) a mixture of solid and liquid
E) not enough information

18. On a new temperature scale (°Z), water boils at 120.0°Z and freezes at 40.0°Z. Calculate the normal human body temperature using this temperature scale. On the Celsius scale, normal human body temperature could typically be 37.1°C, and water boils at 100.0°C and freezes at 0.00°C.

A) 2968°Z
B) 12.4°Z
C) 69.7°F
D) 111°Z
E) 29.7°Z

19. A piece of zinc with a mass of 12.14 g is submerged in 46.3 cm^3 of water in a graduated cylinder. The water level increases to 48.0 cm^3. The correct value for the density of zinc from these data is:

A) $7.141\ g/cm^3$
B) $7.1\ g/cm^3$
C) $0.14\ g/cm^3$
D) $0.253\ g/cm^3$
E) $3.95\ g/cm^3$

20. A 20.0 mL sample of glycerol has a mass of 25.2 grams. What is the mass of a 57-mL sample of glycerol?

A) 8.8 g
B) 45 g
C) 2.9×10^4 g
D) 72 g
E) 71.8 g

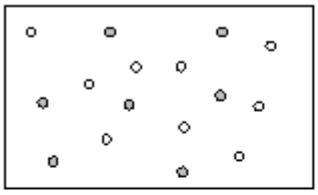
21. A freighter carrying a cargo of uranium hexafluoride sank in the English Channel in late August 1984. The cargo of uranium hexafluoride weighed 2.253×10^8 kg and was contained in 30 drums, each containing 1.47×10^6 L of UF_6. What is the density (g/mL) of uranium hexafluoride?
    A) 1.53 g/mL
    B) 5.11 g/mL
    C) 2.25 g/mL
    D) 0.196 g/mL
    E) 51.1 g/mL

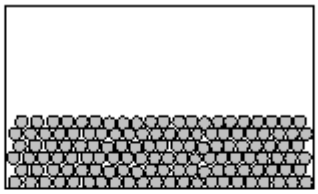
22. The boiling of water is a
    A) physical change because the water merely disappears
    B) physical change because the gaseous water is chemically the same as the liquid
    C) chemical change because heat is needed for the process to occur
    D) chemical change because a gas (steam) is given off
    E) chemical and physical damage

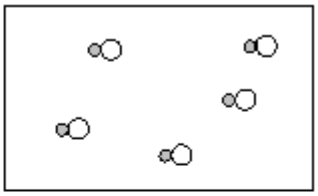
23. A method of separation that employs a system with two phases of matter, a mobile phase and a stationary phase, is called
    A) filtration
    B) chromatography
    C) distillation
    D) vaporization
    E) homogenization

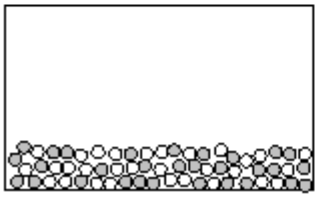
24. A solution is also called a
    A) homogeneous mixture
    B) heterogeneous mixture
    C) pure mixture
    D) compound
    E) distilled mixture

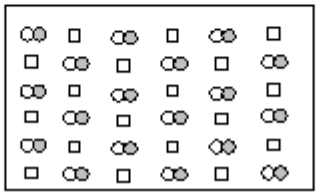
Consider the following choices when answering questions 25-28.

a) 

b) 

c) 

d) 

e) 

25. Which best represents a homogeneous mixture of an element and a compound?
    A) option a
    B) option b
    C) option c
    D) option d
    E) option e

26. Which best represents a gaseous compound?
    A) option a
    B) option b
    C) option c
    D) option d
    E) option e

27. Which best represents a solid element?
    A) option a
    B) option b
    C) option c
    D) option d
    E) option e

28. Which best represents a heterogeneous mixture of two elements?
    A) option a
    B) option b
    C) option c
    D) option d
    E) option e

29. How many significant figures are in 0.00110
    A) 2
    B) 3
    C) 4
    D) 5

30. Which separation technique is based on differences in the volatility of the substances to be separated?
    A) filtration
    B) distillation
    C) solvent extraction
    D) paper chromatography

G**o Vikings!**