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

1) Which formula/name pair is incorrect?
   A) FeSO₃ iron(II) sulfite
   B) Fe₂(SO₃)₃ iron(III) sulfite
   C) Fe₂(SO₄)₃ iron(III) sulfate
   D) FeSO₄ iron(II) sulfate
   E) FeS iron(II) sulfide

2) Osmium has a density of 22.6 g/cm³. What volume (in cm³) would be occupied by a 21.8 g sample of osmium?
   A) 1.04
   B) 0.965
   C) 493
   D) 2.03 x 10⁻³
   E) 2.03 x 10⁻³

3) Expressing a number in scientific notation ____________
   A) changes its value
   B) allows to increase the number's precision
   C) removes ambiguity as to the significant figures
   D) removes significant zeros
   E) all of the above

4) Which one of the following compounds is chromium(III) oxide?
   A) Cr₃O₂
   B) CrO₃
   C) Cr₃O
   D) Cr₂O₃
   E) Cr₂O₄

5) Of the choices below, which one is not an ionic compound?
   A) RbCl
   B) NaCl
   C) PbCl₂
   D) PCl₅
   E) MoCl₆

6) In the symbol below, x = ____________.

   \[
   \frac{x}{6} \text{C}
   \]
   A) 13
   B) 19
   C) 6
   D) 7
   E) not enough information to determine
7) In the symbol below, x is ________.
   \[ \frac{x}{6} \text{C} \]
   A) the atomic number
   B) the number of neutrons
   C) the isotope number
   D) the elemental symbol
   E) the mass number

8) The suffix -ide is used primarily ________.
   A) to indicate binary acids
   B) for monatomic anion names
   C) for the name of the first element in a molecular compound
   D) for monoatomic cations
   E) for polyatomic cation names

9) Which formula/name pair is incorrect?
   A) Mg(MnO₄)₂ magnesium permanganate
   B) Mg(NO₃)₂ magnesium nitrate
   C) Mn(NO₂)₂ manganese(II) nitrite
   D) Mg₃N₂ magnesium nitrite
   E) Mn(NO₃)₂ manganese(II) nitrate

10) Which pair of elements below should be the most similar in chemical properties?
    A) C and O
    B) Cs and He
    C) I and Br
    D) B and As
    E) K and Kr

11) Which species below is the nitride ion?
    A) NO₂⁻       B) N⁺³⁻       C) NO₃⁻       D) NH₄⁺       E) Na⁺

12) The correct name for Ni(CN)₂ is ________.
    A) nickel cyanate
    B) nickel (I) nitride
    C) nickel (II) cyanide
    D) nickel carbonate
    E) nickel (I) cyanide
20) The width, length, and height of a large, custom-made shipping crate are 1.22 m, 3.22 m, and 0.83 m, respectively. The volume of the box using the correct number of significant figures is \[ \text{m}^3 \].

A) 3.261  
B) 3.2606  
C) 3.3  
D) 3.26057  
E) 3.26

21) The element X has three naturally occurring isotopes. The masses (amu) and % abundances of the isotopes are given in the table below. The average atomic mass of the element is \[ \text{amu} \].

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Abundance</th>
<th>Mass</th>
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<tbody>
<tr>
<td>221X</td>
<td>74.22</td>
<td>220.9</td>
</tr>
<tr>
<td>220X</td>
<td>12.78</td>
<td>220.0</td>
</tr>
<tr>
<td>218X</td>
<td>13.00</td>
<td>218.1</td>
</tr>
</tbody>
</table>

A) 220.4  
B) 218.5  
C) 220.42  
D) 219.7  
E) 221.0

22) Which of the following compounds would you expect to be ionic?

A) CaO  
B) SF\(_6\)  
C) H\(_2\)O\(_2\)  
D) NH\(_3\)  
E) H\(_2\)O
13) Iron has a density of 7.9 g/cm³. What is the mass of a cube of iron with the length of one side equal to 55.0 mm?
   A) $2.1 \times 10^4$ g
   B) $2.3 \times 10^{-2}$ g
   C) 1.4 g
   D) $1.3 \times 10^3$ g
   E) $4.3 \times 10^2$ g

   \[
   (5.5 \text{ cm})^3 \times 7.9 \text{ g/cm}^3 = 55 \text{ mm} = 5.5 \text{ cm}
   \]

14) In which one of the following numbers are none of the zeros significant?
   A) 1065
   B) 100.0
   C) 0.0001
   D) 0.0100
   E) 1.003450

15) The number with the most significant zeros is ________.
   A) 250000001
   B) $2.501 \times 10^{-7}$
   C) 2.5100000
   D) 0.02500001
   E) 0.00002510

16) How many liters of wine can be held in a wine barrel whose capacity is 26.0 gal?
   1 gal = 4 qt = 3.7854 L.
   A) $1.46 \times 10^{-4}$
   B) 6.87
   C) 0.146
   D) 98.4
   E) $6.87 \times 10^3$

17) A wooden object has a mass of 10.782 g and occupies a volume of 13.72 mL. What is the density of the object determined to an appropriate number of significant figures?
   A) $8 \times 10^{-1}$ g/mL
   B) $7.9 \times 10^{-1}$ g/mL
   C) $7.86 \times 10^{-1}$ g/mL
   D) $7.859 \times 10^{-1}$ g/mL
   E) $7.8586 \times 10^{-1}$ g/mL

18) The correct name for MgF₂ is ________.
   A) magnesium difluoride
   B) manganese difluoride
   C) manganese bifluoride
   D) monomagnesium difluoride
   E) magnesium fluoride

19) Which of the following has the same number of significant figures as the number 1.00310?
   A) 199.791
   B) 8.66
   C) 100
   D) 5.119
   E) $1 \times 10^6$