*** ALWAYS ANSWER IN FULL SENTENCES! 
*** On numerical problems, you MUST show your set ups. When dimensional analysis is specified, you MUST set up the problem by dimensional analysis. 
*** Use your time wisely. Do not get stuck on one question. 
*** Answer each question carefully, with thought and with confidence! Do not stop to check over your work until you have worked through the entire exam. 

<table>
<thead>
<tr>
<th>PAGE</th>
<th>TOTAL SCORE POSSIBLE</th>
<th>YOUR SCORE</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>33</td>
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<td>2</td>
<td>19</td>
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<td>3</td>
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<td>4</td>
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<td>TOTAL</td>
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<tr>
<td>Bonus p.5</td>
<td>10</td>
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</tr>
</tbody>
</table>

Adjusted total to Exam I = 

Current Course Total =

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>MASS</th>
<th>VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in =</td>
<td>2.54 cm (exactly)</td>
<td>1 lb = 454 g</td>
</tr>
<tr>
<td>1 mi =</td>
<td>5280 ft (exactly)</td>
<td>1 ton = 2000 lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 gal = 4 qt</td>
</tr>
</tbody>
</table>
1. (12 pts) Give the formula or name as indicated below:
HINT: Think carefully about which ones require Roman numerals!

<table>
<thead>
<tr>
<th>Formula</th>
<th>NAME (Watch your spelling!)</th>
<th>Formula</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn²⁺</td>
<td></td>
<td>_______</td>
<td>sodium oxide</td>
</tr>
<tr>
<td>Cu₂O</td>
<td></td>
<td>_______</td>
<td>iron(II) bromide</td>
</tr>
<tr>
<td>PbS₂</td>
<td></td>
<td>_______</td>
<td>calcium nitride</td>
</tr>
</tbody>
</table>

2. (8 pt) Give the formula and physical states for the following elements:
Follow the example shown for the first one.

<table>
<thead>
<tr>
<th>Name</th>
<th>Formula &amp; Physical State</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydrogen</td>
<td>H₂ (g)</td>
</tr>
<tr>
<td>mercury</td>
<td>_______</td>
</tr>
<tr>
<td>phosphorus</td>
<td>_______</td>
</tr>
<tr>
<td>xenon</td>
<td>_______</td>
</tr>
<tr>
<td>iodine</td>
<td>_______</td>
</tr>
</tbody>
</table>

3. (3 pts) How many significant figures are in each of the following numbers?

a) 2000 Ans. _____
b) 0.0038 Ans. _____
c) 1.020 x 10³ Ans. _____

4. (2 pts) Which of the following numbers need not be in scientific notation? Circle all that applies.

a) 0.213     b) 3.1 x 10     c) 150     d) 45

5. (4 pts) Round the following numbers to the designated number of sig. fig. Use scientific notation only when appropriate!

a) 0.135 to 2 sig. fig. = _______________ b) 78100 to 2 sig. fig. = _______________

6. (4 pts) Express the following in scientific notation:

a) 137.2 x 10⁻⁵ = _______________ b) 0.002 x 10⁷= _______________
7. (6 pts) Give your answer in the correct number of sig. fig. Use scientific notation only when appropriate. You may use your calculator if you wish but remember that your calculator does NOT figure out sig. fig.!!

A. \( 48.32 - 48.31 = \)  
   Ans. ________________

B. \( \frac{7.5 + 5.3}{7.83} = \)  
   Ans. ________________

C. \( \frac{4.64 \times 10^{-39}}{39.86 \times 10^{42} \times 21.6 \times 10^{-28}} \)  
   Ans. ________________

8. (2 pts) Do the following calculations. Treat all the numbers as being “exact”.

\( 8 - 5 \times 3 + 7 (5 + 3) \div 2 = \)  
Ans. ________________

9. (2 pts) Solve for the unknown \( X \). Show your work clearly. Write your answer in the box.

\( \frac{3}{X} \frac{B}{A} \)  
\( X = \) ________________

10. (2 pts) Record the length of the object above the ruler to the correct significant figures.

   Ans. ________________

11. (4 pts) Give the definition of each of the following by completing the sentence. Do not give examples.

   Matter is…

   Chemistry is…
13. (12 pts) **Using dimensional analysis AS SHOWN IN LECTURE**, perform the following conversions. Be sure to give your answers to the correct sig. fig. No credit will be given if the dimensional analysis set up is not shown! *Use scientific notation in your answer only if necessary.*

A. Convert 0.372 cm to nanometer
Ans. ___________________

B. What is 12.7 ft in km?
Ans. ___________________

C. A solution has a density of 1.73 g/mL. If it weighs 4.3 ounces, what is its volume?
Ans. ___________________

14. (4 pts) Put a check mark ✓ if the substance belongs in this group. Put a cross mark X if the substance does NOT belong in this group.

<table>
<thead>
<tr>
<th></th>
<th>atom</th>
<th>molecule</th>
<th>element</th>
<th>compound</th>
<th>ionic compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>KF</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hf</td>
<td></td>
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<tr>
<td>HF</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>H₂</td>
<td></td>
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*Be sure every spot in the table above has either a check mark ✓ or an X*

15. (4 pts) Convert 87.3°F to degrees Celsius. Show your work clearly and watch your sig. fig. 

\[ F = 1.8C + 32 \] (1.8 and 32 are exact numbers)

Ans. ___________________
16. (4 pts) What is the name of the process of a liquid changing to its gaseous state? Ans. _____________________

What is the name of the process of a solid changing to its gaseous state without melting? Ans. _____________________

17. (2 pts) Which of the following is a unit of density? CIRCLE ALL THAT APPLIES. There may be more than one answer.
A. g  B. cm³  C. mL/g  D. pounds/gallon  E. g/L

(2 pts each) Multiple Choice:  **Circle ONE** letter corresponding to the best answer in each case.

18. Which of the following corresponds to cm • \( \frac{1}{g/cm^2} \)?
A. g  B. cm²/g  C. g/cm²  D. none of the above

19. Which of the following is halogen?
A. K  B. Ca  C. Co  D. As  E. P  F. Br

20. Which of the following is an ionic compound?
A. HgBr₂  B. NO₂  C. Na  D. Cu²⁺  E. None of the above.

21. Brass is…
A. an element  B. a compound  C. a heterogeneous mixture  D. homogeneous mixture  E. None of the above

22. Which of the following describes a chemical property?
A. Hydrogen gas is flammable.
B. Table salt is soluble in water.
C. Zinc melts at 420°C.
D. None of the above.

23. The process of water boiling is an…
A. endothermic reaction.  B. exothermic reaction.

24. Density is an…
A. extensive property  B. intensive property

25. Which of the following statements relating to the diagram below is correct?
A. The diagram illustrates a pure substance.
B. The diagram illustrates an element.
C. The diagram illustrates a mixture of two elements.
D. The diagram illustrates a mixture of an element and a compound.
E. The diagram illustrates a mixture of two compounds.

26. Which is the correct order of the steps in the scientific method as presented in the lecture?
A. theory  test  hypothesis  observation
B. hypothesis  test  observation  theory
C. observation  hypothesis  test  theory
D. theory  test  observation  hypothesis
27. Which of the following does **not** belong in the Kinetic Molecular Theory of Gases?
   A. Gas molecules are widely spaced.
   B. The actual volume of molecules is negligible compared to the space they occupy.
   C. Gases are compressible.
   D. Molecules collide with each other and with the container walls without loss of total kinetic energy.

28. When two gases mix in a container, the heavier gas exerts a higher pressure at the top of the container.
   A. True   B. False

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**BONUS POINTS**

(1 pt) *Make sure you have your full name on both sides of every page!!!*

(1 pt) Convert 6.8 cm$^3$ to milliliters.

   Ans. ________