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Last

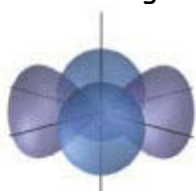
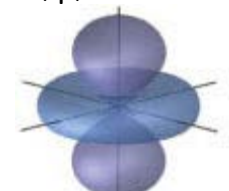
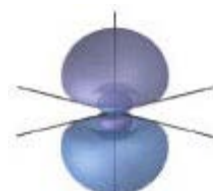
KEY

First

ANSWER

<p>Question 1 8 Points</p>	<p>a) How many significant figures are there in each of the following numbers? 0.927790 <u>6</u> 0.060464 <u>5</u> 1.00×10^3 <u>3</u></p> <p>b) There are 12 eggs in a dozen. A farm produces 747 dozen eggs a month, how should the number of eggs per month be reported? <u>8.96×10^3</u></p> <p>c) The number 447.496 rounded to 4 significant figures is: <u>447.5</u></p>						
<p>Question 2 6 Points</p>	<p>a) When 17.2 is subtracted from 45.58, the result should be reported with digit(s) <u>1</u> after the decimal point.</p> <p>b) When 85.49 is divided by 59.6, the answer should be reported to significant digit(s) <u>3</u>.</p>						
<p>Question 3 3 Points</p>	<p>A piece of copper contains 6.7×10^8 atoms. What is the volume of the sample in units of liters.</p> <table border="1" data-bbox="300 825 1576 909"> <tr> <td>$1 \text{ cm}^3 \text{ Cu} = 8.8 \text{ g Cu}$</td> <td>$9.5 \times 10^{21} \text{ atoms Cu} = 1 \text{ g Cu}$</td> <td>$1 \text{ Kg} = 1000 \text{ g}$</td> </tr> <tr> <td>$1 \text{ L} = 1000 \text{ cm}^3$</td> <td>$1 \text{ mL} = 1 \text{ cm}^3$</td> <td></td> </tr> </table> <p>No need to do the calculation - just set up the correct dimensional analysis conversions - you may not need to fill in all the boxes.</p> $6.7 \times 10^8 \text{ atoms} \times \frac{1 \text{ g Cu}}{9.5 \times 10^{21} \text{ atoms}} \times \frac{1 \text{ cm}^3 \text{ Cu}}{8.8 \text{ g Cu}} \times \frac{1 \text{ L}}{1000 \text{ cm}^3}$	$1 \text{ cm}^3 \text{ Cu} = 8.8 \text{ g Cu}$	$9.5 \times 10^{21} \text{ atoms Cu} = 1 \text{ g Cu}$	$1 \text{ Kg} = 1000 \text{ g}$	$1 \text{ L} = 1000 \text{ cm}^3$	$1 \text{ mL} = 1 \text{ cm}^3$	
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<p>Question 4 3 Points</p>	<p>A 0.0635 L sample of a liquid has a mass of 87.6 g. Identify it as either nonane (density = 0.719 g/mL) or iodoheptane (density = 1.38 g/mL). <u>iodoheptane</u></p>						
<p>Question 5 3 Points</p>	<p>The element copper has two stable isotopes, copper-63 with an atomic mass of 62.93 amu and copper-65 with an atomic mass of 64.93 amu. From the atomic weight of Cu = 63.54 one can conclude that:</p> <ul style="list-style-type: none"> <input type="checkbox"/> copper-65 has the highest percent natural abundance <input type="checkbox"/> both isotopes have the same percent natural abundance <input type="checkbox"/> most copper atoms have an atomic mass of 63.54 <input checked="" type="checkbox"/> copper-63 has the highest percent natural abundance 						
<p>Question 6 6 Points</p>	<p>A certain element consists of two stable isotopes. The first has an atomic mass of 107 amu and a percent natural abundance of 51.8%. The second has an atomic mass of 109 amu and a percent natural abundance of 48.2%. What is the atomic mass of the element?</p> $0.518(107) + 0.482(109) = 107.964^*$ <p>* These are exact numbers</p> <p style="text-align: right;"><u>107.964</u> amu</p>						

<p>Question 7 6 Points</p>	<p>Decide if the following statements are true (T) or false (F):</p> <p>a) Protons and neutrons are equal in mass, but opposite in charge. <u>F</u></p> <p>b) The mass of a proton is about the same as the mass of an electron. <u>F</u></p> <p>c) The electron acts as a buffer zone in the nucleus <u>F</u></p>
<p>Question 8 10 Points</p>	<p>The following questions pertain to the periodic table given at the front of this exam:</p> <p>a. The atomic number for the element that is in group 4A and period 2? <u>6</u></p> <p>b. The atomic weight for the element in group 3A and period 4? <u>69.72</u></p> <p>c. Check the elements that would be expected to have similar properties?</p> <p><input type="checkbox"/> Pb <input checked="" type="checkbox"/> Cl <input type="checkbox"/> Be <input checked="" type="checkbox"/> I <input type="checkbox"/> Rn</p> <p>d. What is the symbol of the alkali metal that is in period 5? <u>Rb</u></p> <p>e. A student when asked to give the formula for the 7 elements that exist as diatomics, gave the following answer. Circle the incorrect answer and in the space provided give the formula for the diatomic that the students missed</p> <p><input type="checkbox"/> H₂ <input type="checkbox"/> N₂ <input type="checkbox"/> Br₂ <input type="checkbox"/> I₂ <input checked="" type="checkbox"/> At₂ <input type="checkbox"/> O₂ <input type="checkbox"/> Cl₂ : <u>F₂</u></p>
<p>Question 9 3 Points</p>	<p>Order the following (from 1-3) in order of the greatest force of attraction: (1 being the greatest and 3 the smallest)</p> <p>a) K⁺ and Cl⁻ separated by a distance of 347 pm <u>2</u></p> <p>b) Ca²⁺ and S²⁻ separated by a distance of 347 pm <u>1</u></p> <p>c) K⁺ and I⁻ separated by a distance of 412 pm <u>3</u></p>
<p>Question 10 8 Points</p>	<p>Give the correct formula for the following polyatomic ions:</p> <p>a) Phosphide <u>P³⁻</u></p> <p>b) Phosphate <u>PO₄³⁻</u></p> <p>c) Dihydrogen phosphate <u>H₂PO₄⁻</u></p> <p>d) Ammonium <u>NH₄⁺</u></p>
<p>Question 11 8 Points</p>	<p>a. Name the compound with the formula MgS? <u>Magnesium sulfide</u></p> <p>b. Name the compound with the formula Fe(NO₂)₂? <u>Iron(II) nitrite</u></p> <p>c. What is the formula for sodium hydrogen carbonate? <u>NaHCO₃</u></p> <p>d. What is the formula for copper(II) sulfite? <u>CuSO₃</u></p>
<p>Question 12 2 Points</p>	<p>How many moles of sulfur are present in 4.37 moles of S₂F₁₀? <u>Show Work</u></p> $\begin{array}{r l} 4.37 \text{ mol S}_2\text{F}_{10} & 2 \text{ S} \\ \hline & 1 \text{ S}_2\text{F}_{10} \end{array}$ <p><u>8.74</u> mol of S</p>

<p>Question 13 4 Points</p>	<p>How many grams of Al_2O_3 are in 1.03 mol of this compound? <u>Show Work</u></p> <p style="text-align: center;">$\text{Al}_2\text{O}_3 : 2(26.98) + 3(16.00) = 101.96 \text{ g mol}^{-1}$</p> $\frac{1.03 \text{ mol Al}_2\text{O}_3}{1 \text{ mol}} \left \frac{101.96 \text{ g}}{1 \text{ mol}} \right. =$ <p style="text-align: right;"><u>105</u> g Al_2O_3</p>
<p>Question 14 6 Points</p>	<p>Balance the following chemical equations using the smallest possible integer coefficients.</p> <p>a) <u> </u> Mg_3N_2 (s) + <u> 6 </u> H_2O (l) \longrightarrow <u> 3 </u> $\text{Mg}(\text{OH})_2$ (aq) + <u> 2 </u> NH_3 (aq)</p> <p>b) The complete oxidation reaction that occurs when cyclopropane (C_3H_6) burns in air.</p> <p style="text-align: center;"><u> 2 </u> C_3H_6 + <u> 9 </u> O_2 (g) \longrightarrow <u> 6 </u> <u> CO_2 </u> + <u> 6 </u> <u> H_2O </u></p> <p>c) When nitrogen reacts with hydrogen, ammonia (NH_3) is formed</p> <p style="text-align: center;"><u> </u> <u> N_2 </u> + <u> 3 </u> <u> H_2 </u> \longrightarrow <u> 2 </u> NH_3</p>
<p>Question 15 8 Points</p>	<p>a) How many orbitals are there in the shell with $n = 3$ in an atom? <u> 9 </u></p> <p>b) How many types of orbitals are there in the shell with $n = 3$ in an atom? <u> 3 </u></p> <p>c) What is the maximum number of electrons possible in a set of 5d orbitals? <u> 10 </u></p> <p>d) How many 5f orbitals are there in an atom? <u> 7 </u></p>
<p>Question 16 6 Points</p>	<p>Label the following orbital drawings as s, p, d or f.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><u> d </u></p> </div> <div style="text-align: center;">  <p><u> d </u></p> </div> <div style="text-align: center;">  <p><u> p </u></p> </div> </div>
<p>Question 17 10 Points</p>	<p>a) Write the complete electronic configuration for phosphorus? <u> $1s^2 2s^2 2p^6 3s^2 3p^3$ </u></p> <p>b) Write the noble gas configuration for vanadium, (V)? <u> $[\text{Ar}] 4s^2 3d^3$ </u></p> <p>c) The element with an electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$ <u> Mn </u></p> <p>d) Se, $[\text{Ar}] 4s^2 3d^{10} 4p^4$, has how many valence electrons? <u> 6 </u></p> <p>e) The element in period 4 that has the Lewis diagram, $\cdot \text{X} \cdot$ <u> Ge </u></p>