

# Exam Number 1

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Welcome to the first exam. There are 20 points, total, available. It is vitally important that you show your work both on this and future exams. No work shown means no credit. Obviously with multiple choice answers there will be no work to be shown, but otherwise, if you think of it, write it down. Exams sheets should be filled out electronically or can be printed, completed and scanned. Attach the completed exam to the exam submission link. If you have any questions, do not hesitate to contact me via email. All answers will be based on the periodic table below. Good Luck!

hydrogen <b>1</b> <b>H</b> <small>1.0079</small>																	helium <b>2</b> <b>He</b> <small>4.0026</small>						
lithium <b>3</b> <b>Li</b> <small>6.941</small>	beryllium <b>4</b> <b>Be</b> <small>9.0122</small>																	boron <b>5</b> <b>B</b> <small>10.811</small>	carbon <b>6</b> <b>C</b> <small>12.011</small>	nitrogen <b>7</b> <b>N</b> <small>14.007</small>	oxygen <b>8</b> <b>O</b> <small>15.999</small>	fluorine <b>9</b> <b>F</b> <small>18.998</small>	neon <b>10</b> <b>Ne</b> <small>20.180</small>
sodium <b>11</b> <b>Na</b> <small>22.990</small>	magnesium <b>12</b> <b>Mg</b> <small>24.305</small>																	aluminum <b>13</b> <b>Al</b> <small>26.982</small>	silicon <b>14</b> <b>Si</b> <small>28.086</small>	phosphorus <b>15</b> <b>P</b> <small>30.974</small>	sulfur <b>16</b> <b>S</b> <small>32.065</small>	chlorine <b>17</b> <b>Cl</b> <small>35.453</small>	argon <b>18</b> <b>Ar</b> <small>39.948</small>
potassium <b>19</b> <b>K</b> <small>39.098</small>	calcium <b>20</b> <b>Ca</b> <small>40.078</small>	scandium <b>21</b> <b>Sc</b> <small>44.956</small>	titanium <b>22</b> <b>Ti</b> <small>47.867</small>	vanadium <b>23</b> <b>V</b> <small>50.942</small>	chromium <b>24</b> <b>Cr</b> <small>51.996</small>	manganese <b>25</b> <b>Mn</b> <small>54.938</small>	iron <b>26</b> <b>Fe</b> <small>55.845</small>	cobalt <b>27</b> <b>Co</b> <small>58.933</small>	nickel <b>28</b> <b>Ni</b> <small>58.693</small>	copper <b>29</b> <b>Cu</b> <small>63.546</small>	zinc <b>30</b> <b>Zn</b> <small>65.39</small>	gallium <b>31</b> <b>Ga</b> <small>69.723</small>	germanium <b>32</b> <b>Ge</b> <small>72.61</small>	arsenic <b>33</b> <b>As</b> <small>74.922</small>	selenium <b>34</b> <b>Se</b> <small>78.96</small>	bromine <b>35</b> <b>Br</b> <small>79.904</small>	krypton <b>36</b> <b>Kr</b> <small>83.80</small>						
rubidium <b>37</b> <b>Rb</b> <small>85.468</small>	strontium <b>38</b> <b>Sr</b> <small>87.62</small>	yttrium <b>39</b> <b>Y</b> <small>88.906</small>	zirconium <b>40</b> <b>Zr</b> <small>91.224</small>	niobium <b>41</b> <b>Nb</b> <small>92.906</small>	molybdenum <b>42</b> <b>Mo</b> <small>95.94</small>	technetium <b>43</b> <b>Tc</b> <small>[98]</small>	ruthenium <b>44</b> <b>Ru</b> <small>101.07</small>	rhodium <b>45</b> <b>Rh</b> <small>102.91</small>	palladium <b>46</b> <b>Pd</b> <small>106.42</small>	silver <b>47</b> <b>Ag</b> <small>107.87</small>	cadmium <b>48</b> <b>Cd</b> <small>112.41</small>	indium <b>49</b> <b>In</b> <small>114.82</small>	tin <b>50</b> <b>Sn</b> <small>118.71</small>	antimony <b>51</b> <b>Sb</b> <small>121.76</small>	tellurium <b>52</b> <b>Te</b> <small>127.60</small>	iodine <b>53</b> <b>I</b> <small>126.90</small>	xenon <b>54</b> <b>Xe</b> <small>131.29</small>						
caesium <b>55</b> <b>Cs</b> <small>132.91</small>	barium <b>56</b> <b>Ba</b> <small>137.33</small>	57-70 *	lutetium <b>71</b> <b>Lu</b> <small>174.97</small>	hafnium <b>72</b> <b>Hf</b> <small>178.49</small>	tantalum <b>73</b> <b>Ta</b> <small>180.95</small>	tungsten <b>74</b> <b>W</b> <small>183.84</small>	rhenium <b>75</b> <b>Re</b> <small>186.21</small>	osmium <b>76</b> <b>Os</b> <small>190.23</small>	iridium <b>77</b> <b>Ir</b> <small>192.22</small>	platinum <b>78</b> <b>Pt</b> <small>195.08</small>	gold <b>79</b> <b>Au</b> <small>196.97</small>	mercury <b>80</b> <b>Hg</b> <small>200.59</small>	thallium <b>81</b> <b>Tl</b> <small>204.38</small>	lead <b>82</b> <b>Pb</b> <small>207.2</small>	bismuth <b>83</b> <b>Bi</b> <small>208.98</small>	polonium <b>84</b> <b>Po</b> <small>[209]</small>	astatine <b>85</b> <b>At</b> <small>[210]</small>	radon <b>86</b> <b>Rn</b> <small>[222]</small>					
francium <b>87</b> <b>Fr</b> <small>[223]</small>	radium <b>88</b> <b>Ra</b> <small>[226]</small>	89-102 **	lawrencium <b>103</b> <b>Lr</b> <small>[262]</small>	rutherfordium <b>104</b> <b>Rf</b> <small>[261]</small>	dubnium <b>105</b> <b>Db</b> <small>[262]</small>	seaborgium <b>106</b> <b>Sg</b> <small>[266]</small>	bohrium <b>107</b> <b>Bh</b> <small>[264]</small>	hassium <b>108</b> <b>Hs</b> <small>[269]</small>	meitnerium <b>109</b> <b>Mt</b> <small>[268]</small>	ununilium <b>110</b> <b>Uun</b> <small>[271]</small>	unununium <b>111</b> <b>Uuu</b> <small>[272]</small>	ununbium <b>112</b> <b>Uub</b> <small>[277]</small>	ununquadium <b>114</b> <b>Uuq</b> <small>[289]</small>										
* Lanthanide series		lanthanum <b>57</b> <b>La</b> <small>138.91</small>	cerium <b>58</b> <b>Ce</b> <small>140.12</small>	praseodymium <b>59</b> <b>Pr</b> <small>140.91</small>	neodymium <b>60</b> <b>Nd</b> <small>144.24</small>	promethium <b>61</b> <b>Pm</b> <small>[145]</small>	samarium <b>62</b> <b>Sm</b> <small>150.36</small>	europium <b>63</b> <b>Eu</b> <small>151.96</small>	gadolinium <b>64</b> <b>Gd</b> <small>157.25</small>	terbium <b>65</b> <b>Tb</b> <small>158.93</small>	dysprosium <b>66</b> <b>Dy</b> <small>162.50</small>	holmium <b>67</b> <b>Ho</b> <small>164.93</small>	erbium <b>68</b> <b>Er</b> <small>167.26</small>	thulium <b>69</b> <b>Tm</b> <small>168.93</small>	ytterbium <b>70</b> <b>Yb</b> <small>173.04</small>								
** Actinide series		actinium <b>89</b> <b>Ac</b> <small>[227]</small>	thorium <b>90</b> <b>Th</b> <small>232.04</small>	protactinium <b>91</b> <b>Pa</b> <small>231.04</small>	uranium <b>92</b> <b>U</b> <small>238.03</small>	neptunium <b>93</b> <b>Np</b> <small>[237]</small>	plutonium <b>94</b> <b>Pu</b> <small>[244]</small>	americium <b>95</b> <b>Am</b> <small>[243]</small>	curium <b>96</b> <b>Cm</b> <small>[247]</small>	berkelium <b>97</b> <b>Bk</b> <small>[247]</small>	californium <b>98</b> <b>Cf</b> <small>[251]</small>	einsteinium <b>99</b> <b>Es</b> <small>[252]</small>	fermium <b>100</b> <b>Fm</b> <small>[257]</small>	mendelevium <b>101</b> <b>Md</b> <small>[258]</small>	nobelium <b>102</b> <b>No</b> <small>[259]</small>								

**Question 1** (1 Points)

*How many of each of the following does a single atom of Polonium-209 have?*

*Protons:* \_\_\_\_\_

*Neutrons:* \_\_\_\_\_

*Electrons:* \_\_\_\_\_

**Question 2** (2 Points)

*Complete the following Table. Rank the sub-atomic particles according to mass, 1 being the heaviest particle and 3 being the lightest.*

<b>Particle Name</b>	<b>Particle Charge</b>	<b>Particle Location</b>	<b>Particle Relative Mass</b>
Proton			
Neutron			
Electron			

**Question 3** (2 Points)

Given the following neutral atom  ${}^{234}_{90}\text{Th}$  How many are there of the following:

Protons: \_\_\_\_\_

Neutrons: \_\_\_\_\_

Electrons: \_\_\_\_\_

**Question 4** (2 Points)

What is meant by the term nucleon? Give two examples of nucleons.

**Question 5** (1 Point)

True or False:  ${}^{239}_{93}\text{U}$  is an isotope of the Uranium atom.

**Question 6** (2 Points)

*List three that act upon particles within the nucleus of an atom. Which force is the weakest?*

**Question 7** (2 Points)

*What is meant by the term “mass defect?” Given that an atom of Pu-239 has an atomic mass of 239.0522 AMU, what is its mass defect?*

**Question 8** (3 Points)

*Given that an atom of U-238 has an atomic mass of 238.0508 AMU, what is its binding energy?*

**Question 9** (2 Points)

*Given that an atom of Np-225 has an atomic mass of 225.0339 AMU, what is its binding energy per nucleon?*

**Question 10** (3 Points)

*Given the following information:*

$$\text{Mass of } {}_{92}^{235}\text{U} = 235.0440 \text{ AMU}$$

$$\text{Mass of } {}_{38}^{94}\text{Sr} = 93.9154 \text{ AMU}$$

$$\text{Mass of } {}_{54}^{139}\text{Xe} = 235.0440 \text{ AMU}$$

*An atom of U-235 absorbs a neutron and fissions into 1 atom of Sr-94, 1 atom of Xe-139 and three neutrons.*

*How much energy is released from this event?*