1. Define nuclear chemistry.
2. Define the two forces in the nucleus.
3. How do the two forces in the nucleus interact with each other?
4. Explain what makes some atoms unstable and radioactive. List the three conditions that lead to an unstable nucleus.
5. Fill in the following chart comparing alpha, beta, and gamma radiation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mass | Charge | Penetration Power/Strength | Symbol |
| Alpha |  |  |  |  |
| Beta |  |  |  |  |
| Gamma |  |  |  |  |

1. Fill in the following chart comparing alpha, beta, and gamma radiations.

|  |  |  |
| --- | --- | --- |
|  | Change in atomic number | Change in mass number |
| Alpha |  |  |
| Beta |  |  |
| Gamma |  |  |

1. Label the following as alpha, beta, or gamma decays:
   1. An atom has decayed from Uranium - 238 to Thorium – 234
   2. Lead - 214 decayed into Bismuth - 214
   3. 226Ra has become 222Rn
   4. 230Th has given off radiation, but is still 230Th
   5. 32P over time has turned into 28Al
2. Identify the following reactions as being alpha, beta, or gamma decay reactions.
   1. Protactinium Decay showing only Gamma Radiation
   2. 
   3. 
3. What is the difference between fusion and fission? Provide an example of each type of reaction.
4. How does a chemical reaction compare in energy to a nuclear reactions such as fission and fusion reactions?
5. Describe the process that most of the elements in the universe (other than Hydrogen) went through to be formed. Answer the following questions as part of your description. Where were they formed? What nuclear process formed them? What had to happen for elements heavier than Iron to form?
6. What is the most abundant element in the universe? Explain why.
7. What happens to the abundance of an element as atomic number increases? Explain why.