**Nuclear Reactions**

Student's Name

Institution

Course

Instructor's Name

Date

**Nuclear Reactions**

1- **Mention 3 similarities and 3 differences between chemical reactions and nuclear reactions.** a chemical reaction refers to when one or more substances the reactants are converted to other substances that is the products. It involves rearrangements of different atoms into products. A nuclear reaction, involves a change in the characteristics of the atomic nucleus into a different particle.

Both nuclear and chemical ructions involve changes in different isotopes where the elements behave the same; they are both independent of the chemical form of the element. In a compound state, the same number of radioelements shows similar radioactivity.

Differences

1. Chemical reactions occur outside the nuclei, while nuclear reactions occur inside the nuclei.
2. Chemical reactions can be influenced by temperature and pressure, while those factors do not influence nuclear reactions.
3. Chemical reactions can be irreversible or reversible, while nuclear reactions are mainly irreversible (Choppin, Liljenzin & Rydberg, 2002).

2. **The nucleus of Uranium-238 contains 92 protons closely packed in the tiniest region of the atom.**

**a) Are all those particles being repelled inside the atom? Explain.**

the uranium element decays by forming an alpha particle helium nucleus. The protons in the aspect show the positive charge within it and are therefore repelled towards each other.

b. **Why they stay together in that tiny region?** they stay together as they are attracted to each other due to their positive charge, revolving around the same space. The protons and the unruins are attracted to each other within the particle making it that they stay together despite the atom being very tiny.

3. **What is the main type of radioactive emission from Carbon-14? Explain why**.

carbon 14 emits beta particles during radioactive emission. Unlike carbon 12, it contains 6 protons and eight neutrons, an imbalance, making it an isotope. As a result, its radioactive emission is the beta particle.

4. **Which nucleus is produced after a radioactive emission from a Carbon-14 nucleus? Why not a different one?**

When carbon 14 decays, it leads to the formation of the nitrogen 14 nucleus. This is because the neutron loses an electron hence becoming nitrogen 14.

5. **What is the original source of the energy of a radioactive nucleus? Explain**.

any form of decay from unstable nuclei forms active radio nuclei. It involves a configuration of neutrons, protons, and radioactive energy.

**References**

Choppin, G., Liljenzin, J. O., & Rydberg, J. (2002). Radiochemistry and nuclear chemistry. Butterworth-Heinemann.