TYPES OF NUCLEAR REACTIONS

natural transmutation - Uranium spontaneously decays.
\[ ^{238}_{92}U \rightarrow ^{234}_{90}Th + ^{4}_{2}He \]

artificial transmutation - bombardment of a stable isotope to force it to decay.
\[ ^{14}_{7}N + ^{4}_{2}He \rightarrow ^{1}_{1}p + \text{______} \]

When the bullets are ___ charged, they are ___________ by the nucleus they are bombarding. To overcome the repulsions, they must be _______________ to very high speeds by ______________ accelerators.

nuclear fission - Heavy nuclei are bombarded with neutrons and split.
\[ ^{1}_{0}n + ^{235}_{92}U \rightarrow ^{142}_{56}Ba + ^{91}_{36}Kr + 3( ^{1}_{0}n) + E \]

Mass of particles produced is slightly _____ than the mass of the reactants. This mass is converted into ____________. (E = ___ )

critical mass: ______________ mass of ______________ material required for a ______________

nuclear reactors: control fission __________ reactions to produce energy dangers:

nuclear fusion - combination of _____ nuclei into ____ with release of _____
\[ ^{2}_{1}H + ^{3}_{1}H \rightarrow ^{4}_{2}He + ^{1}_{0}n + E \]

Mass of particles produced is much _____ than the mass of the ___________. This ______ is converted into energy. (E = ___ )

On back, list advantages of and problems with using fusion as an energy source.