1. We have a 10 MeV proton beam hitting a ^{63}Cu nucleus and a neutron is ejected in the reaction. In another reaction we use alpha-particle beam on ^{60}Ni target. What should be the kinetic energy of the alpha particles to produce the same excited state of the compound nucleus?

2. We have a sample that contains magnesium, and we try to determine the number of magnesium atoms in the sample using neutron activation analysis. $2,4 \times 10^{11}$ neutron/cm^2/s neutron flux is used to active the magnesium by the ^{26}Mg(n,γ) ^{27}Mg nuclear reaction. The cross section is 0.0372 barn the isotopic abundance of ^{26}Mg is 11%, half live of ^{27}Mg is 9.5 minutes. The 26Mg will emit 843 keV and 1014 keV gamma rays. The abundanec of these are 71% and 29%. 4 minutes after of irradiation of 15 minutes, we measure the number of gammas during another 4 minutes with HPGe detector. The number of gammas are N1 and N2. How many magnesium atoms are there in the sample?