1. Arsenic is implanted into Si (with a 7° tilt) at an energy of 125keV. The dose is \(2 \times 10^{14} \text{ / cm}^2\). What is the peak dopant concentration produced?

2. We are designing an implant step which will implant phosphorus ions through 50 nm of SiO\(_2\) into an underlying silicon substrate such that the peak concentration in the substrate is \(1 \times 10^{17} \text{ cm}^{-3}\) and the concentration at the SiO\(_2\)/Si interface is \(1 \times 10^{16} \text{ cm}^{-3}\). What energy and dose would you use to achieve these conditions? Assume that the stopping power of SiO\(_2\) is the same as that of silicon. Neglect channeling effects.

3. We wish to determine the thickness of a mask needed to reduce the peak concentration of that implant in the mask by a factor of 10,000 at the mask/substrate boundary. Provide an equation in terms of the projected range and the straggle of the implant profile in the mask material.