EE 5621 QUIZ 3 15 October 2021

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Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NOTE: **Use graphs! Units are important!**

**Problem 1** (40 Points) Ion Implantation Pot Pourri

1. For a given acceleration voltage , in general Straggle is about (**5 to 10 times the Range, A bit larger than the Range, The Same as the Range, 0.1 to 0.2 Times the Range**)
2. The range doping profile function is best described as (**Exponential, Linear, ERFC, ERF, Gaussian, Hyperbolic**).
3. In general, for a given acceleration voltage, Donor Dopants have a Range (**Greater Than, About the Same, Less Than**) Acceptor Dopants.
4. In general, the Ion Implantation process yields a junction depth (**Greater Than, About The Same, Less Than**) a Diffusion process for equivalent times and temperatures.

**Problem 2** (60 Points) Ion Implant Calculations

SiO2 0.2m thick

P Implant at 300 A

xj =0.5 m and NA(xj) = 1 x 1015 cm-3

ND(0) = 2 x 1018 cm-3

Si

0

x

1. (15 Points) What acceleration voltage is required such that the peak is at the Si-SiO2 interface as shown in the figure?
2. (5 Points) For this acceleration potential in Part (a) what is the Straggle?
3. (20 Points) For the triangular implant profile, as shown in the figure, what is the dose, Q?
4. (20 Points) What time is required to provide this dose to a 12 inch (30 cm) wafer? Assume singly ionized P.