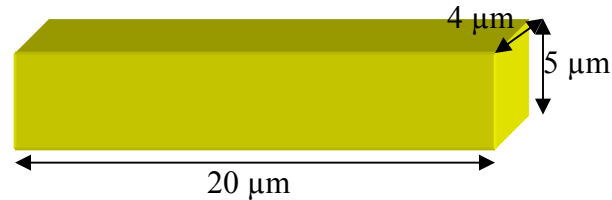


COE 360 – 1st Assignment – Dr. Muhammad Elrabaa

- 1) The following P-type piece of Si is doped with 10^{17} cm^{-3} acceptors and $2 \times 10^{15} \text{ cm}^{-3}$ donors:



- Calculate the resistivity of this piece of Si
- What is the type of doping and its concentration required to invert the type of one side of this piece of Si (making it N-type resulting in a P-N Junction as shown below) while keeping the resistivity the same?
- Calculate the resistance of each side (N and P) of the resulting P-N Junction
- Calculate its built-in potential
- If this diode is used in a circuit where the forward current through it is about 100 mA, estimate the voltage across it? What would happen to the current if the temperature is increased?

