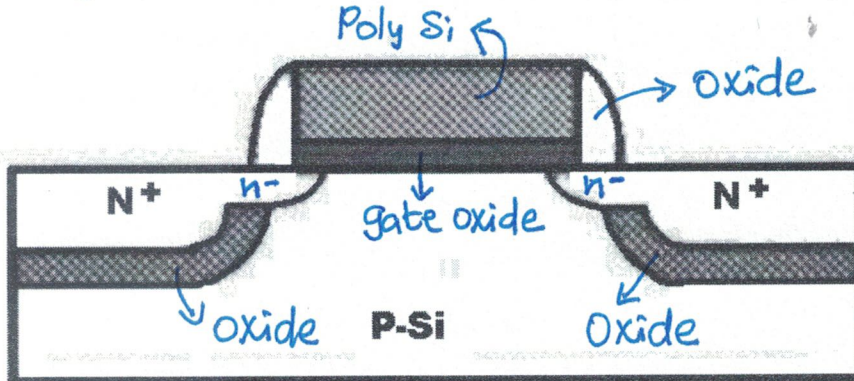
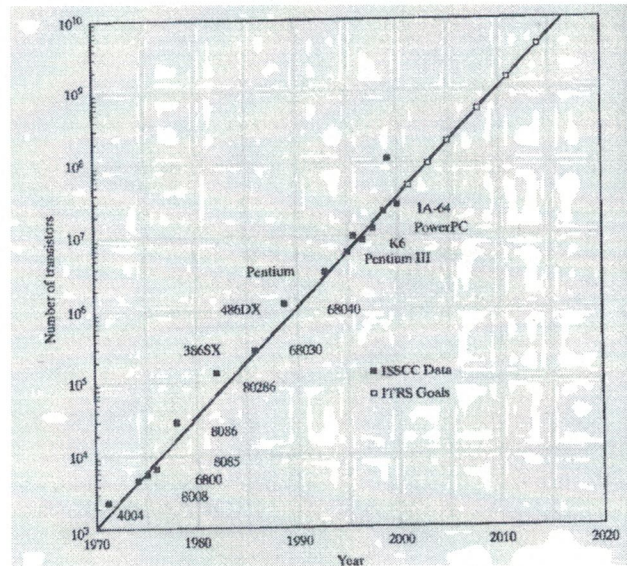


Answer all questions.

Q1: Start with P-type silicon substrate. Identify each of the fabrication steps by drawing the cross-section of the device at every fabrication step. [Marks: 10]



Q2. Consider the number of transistors in a microprocessor as a function of year shown. Fit the straight line by an equation. Using this equation, estimate how many years it would take to increase the number of transistors in the microprocessor by a factor of 10. [Marks: 5]



Q3. A square window is opened through a 1  $\mu\text{m}$  thick oxide on a silicon wafer. The wafer is now subjected to oxidation so that a 1  $\mu\text{m}$  thick oxide grows in the square window. Draw the cross-section of the wafer after the oxidation and identify the thickness of the oxide inside and outside the square window. Also find out the difference in height of silicon in the square window as compared to the outside of the window. What would be the colors of the oxide under vertical illumination inside the square window and outside the square window. [Marks: 10]