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XOR using NAND:-

$$Y = \overline{A \cdot \overline{B}} \cdot \overline{B(\overline{A}B)}$$

$$Y = \overline{A \cdot \overline{A}B} + \overline{B(\overline{A}B)}$$

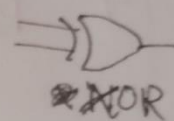
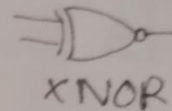
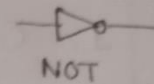
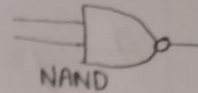
$$Y = A \cdot \overline{A}B + B(\overline{A}B)$$

$$Y = A(\overline{A} + \overline{B}) + B(\overline{A} + \overline{B})$$

$$Y = (A+B)(\overline{A} + \overline{B})$$

$$Y = \overline{A}B + A \cdot \overline{B}$$

$$\therefore Y = A \oplus B$$



We can simply use NOT Gate to XOR Gate to make it XNOR.