الكلية التقنية الهندسية
قسم هندسة تقنيات الحاسوب

Logic Gates

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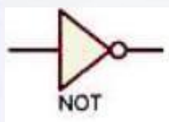
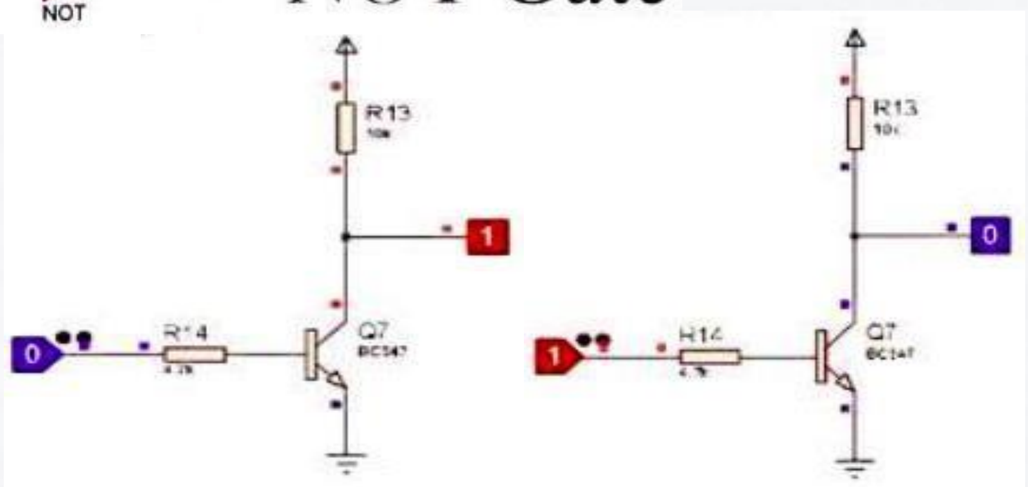
INTRODUCTION :

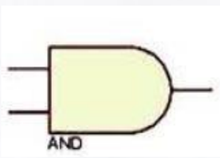
Logic gates are the main component for building any logic circuit. They give only one output (0 or 1) when certain conditions are met at the inputs of this gate. They only deal with Boolean states (0 or 1), so when the Boolean circuit is on, it is given symbol (1), which means (5V), while when the logic circuit is in the off state, it is given the Boolean symbol (0) which means (0 volts). There are three main gates which are the (OR) gate, the (AND) gate, and the (NOT) gate, and through these basic gates, we can have other gates derived from them.

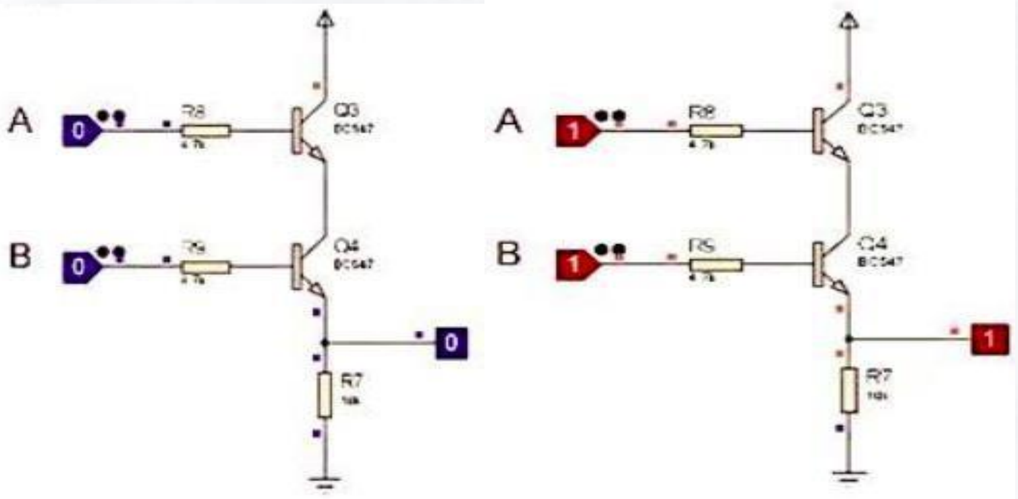
NOT Gate



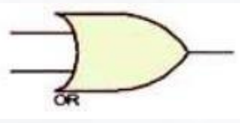


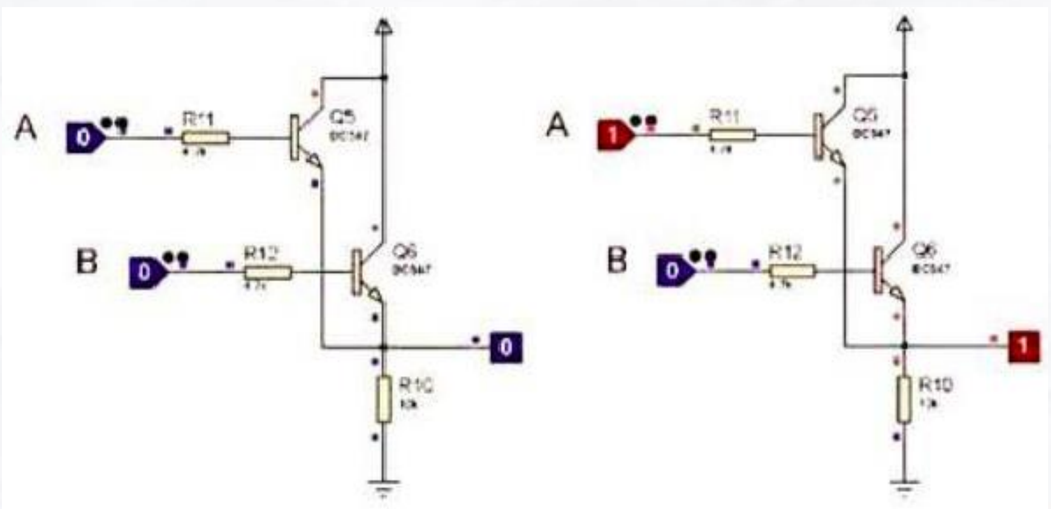
AND Gate

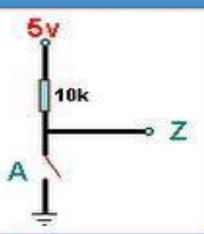
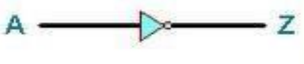
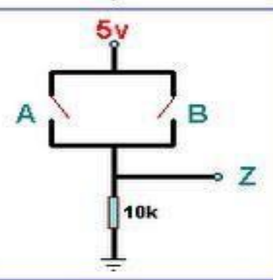
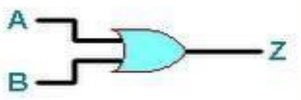
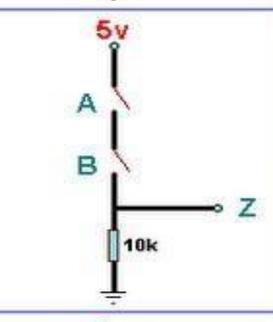
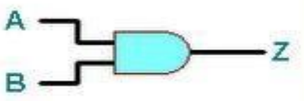
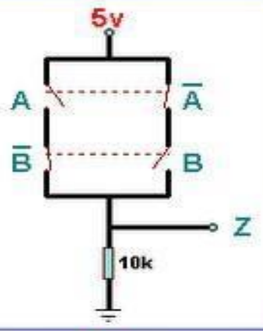
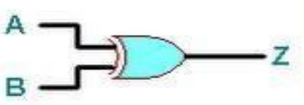
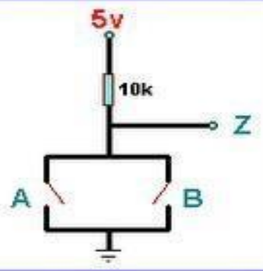
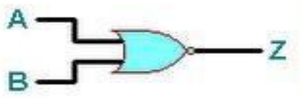
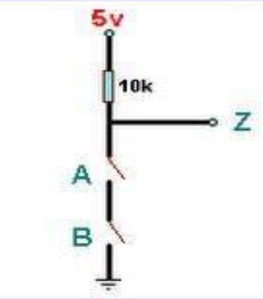
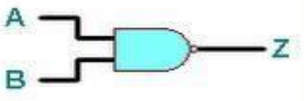




OR Gate





Function	Truth Table	Equivalent Circuit	Logic Representation
NOT $Z = \overline{A}$	A Z 0 1 1 0		
OR $Z = A + B$	A B Z 0 0 0 0 1 1 1 0 1 1 1 1		
AND $Z = A \cdot B$	A B Z 0 0 0 0 1 0 1 0 0 1 1 1		
XOR $Z = A \oplus B$ $Z = \overline{A \odot B}$ $Z = A \cdot \overline{B} + \overline{A} \cdot B$	A B Z 0 0 0 0 1 1 1 0 1 1 1 0		
NOR $Z = \overline{A + B}$	A B Z 0 0 1 0 1 0 1 0 0 1 1 0		
NAND $Z = \overline{A \cdot B}$	A B Z 0 0 1 0 1 1 1 0 1 1 1 0		
XNOR $Z = A \odot B$ $Z = \overline{A \oplus B}$ $Z = A \cdot B + \overline{A} \cdot \overline{B}$	A B Z 0 0 1 0 1 0 1 0 0 1 1 1