

Al-Mustaqbal University Department of Medical Instrumentation Techniques

 3_{rd} year

Power Electronics

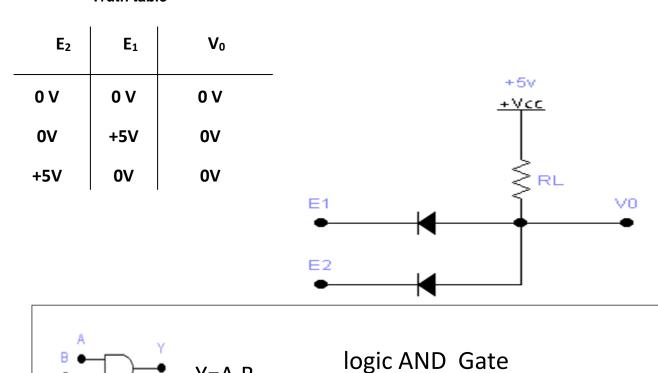
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2.2. DIODE LOGIC GATES

Diode can be used to form logic gates, which perform some of the logical operations required in digital computers.

2.2.1- AND Gate

Truth table



The output of AND Gate becomes 5V only when all input are equal to 5V. The output of OR Gate becomes 5V if one or both inputs are 5V.

Y=A.B

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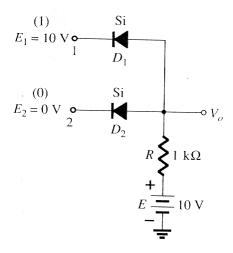
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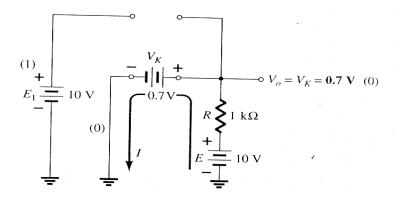
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EXAMPLE 2.5

Determine V_o and I for the logic AND gate of Fig.(2-10)



SOLUTION



$$V_o = V_K = 0.7V$$

$$I = \frac{V_R}{R} = \frac{E - V_K}{R}$$



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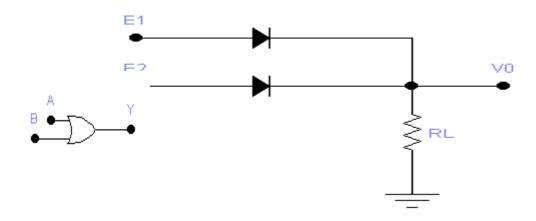
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$$I = \frac{10 - 0.7}{1 \times 10^3} = 9.3 mA$$

2.2.2- OR Gate

Truth table



Y=A+B

logic OR Gate

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EXAMPLE 2.6

Determine V_o and I for the network of Fig.(2-11)

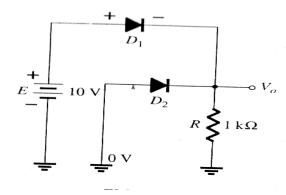
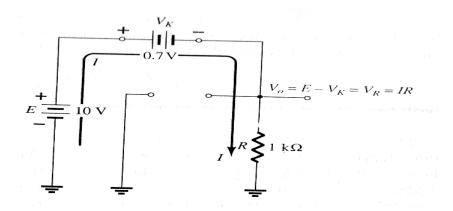


Fig.(2-11)

SOLUTION



$$V_o = E - V_K = 10 - 0.7 = 9.3V$$

$$I = \frac{V_o}{R} = \frac{9.3}{1 \times 10^3} = 9.3 \text{ mA}$$