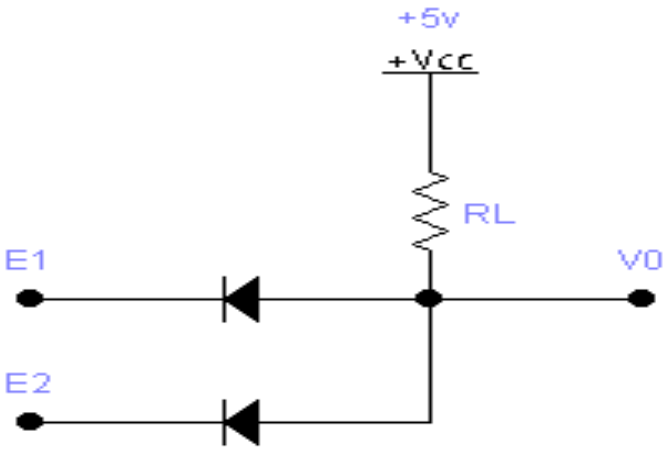
2.2. DIODE LOGIC GATES

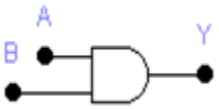
Diode can be used to form logic gates, which perform some of the logical operations required in digital computers.

2.2.1- AND Gate

Truth table

E_2	E_1	V_0
0 V	0 V	0 V
0V	+5V	0V
+5V	0V	0V





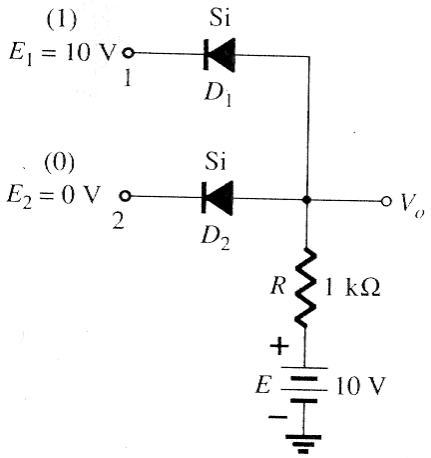
Y=A.B

logic AND Gate

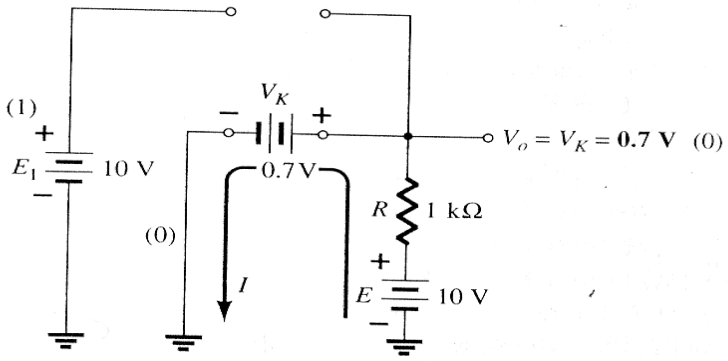
The output of AND Gate becomes 5V only when all input are equal to 5V . The output of OR Gate becomes 5V if one or both inputs are 5V.

EXAMPLE 2.5

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



SOLUTION



$$V_o = V_K = 0.7V$$

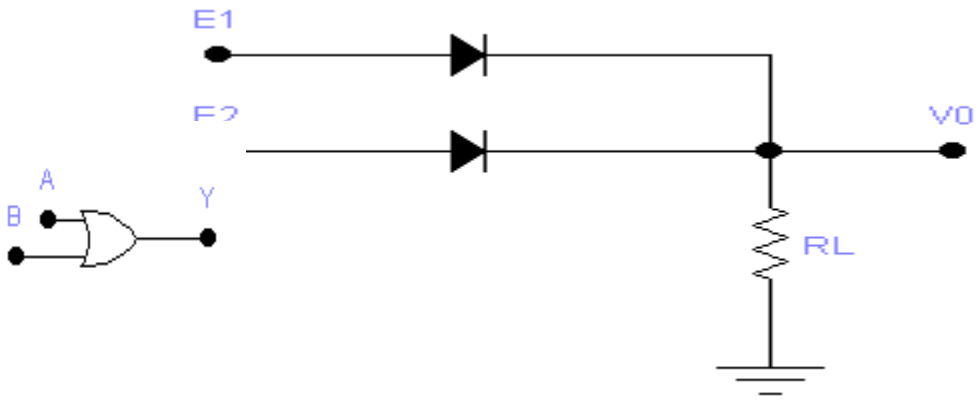
$$I = \frac{V_R}{R} = \frac{E - V_K}{R}$$

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

2.2.2- OR Gate

Truth table

E_2	E_1	V_0
0 V	0 V	0 V
0V	+5V	+5V
+5V	0V	+5V



Y=A+B **logic OR Gate**

EXAMPLE 2.6

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

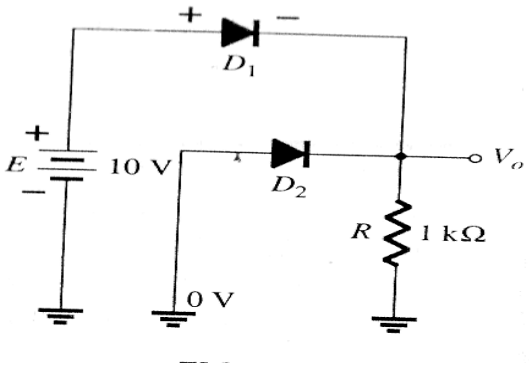
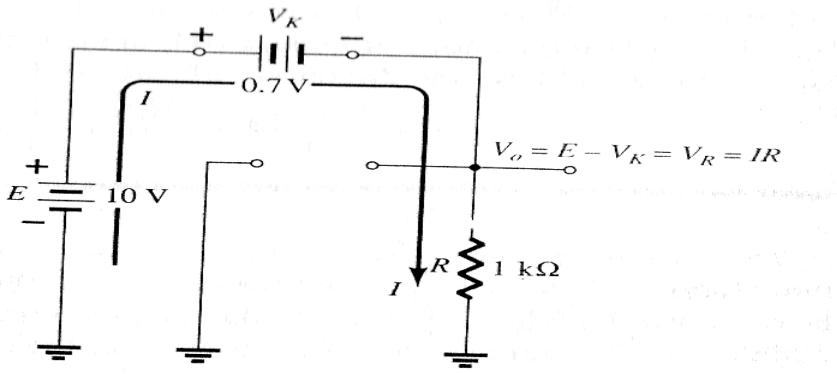


Fig.(2-11)

SOLUTION



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

$$I = \frac{V_o}{R} = \frac{9.3}{1\times10^3} = 9.3mA$$