BRAC UNIVERSITY

Department of Electrical and Electronic Engineering CSE350: Digital Electronics and Pulse Techniques

Experiment No: 1

Implementing Diode Logic (DL) gates

Objective:

1. Construct a DL gate
2. Understanding the circuit operation

Equipments:

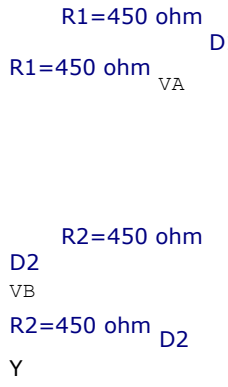
1. Oscilloscope
2. Digital Trainer Board
3. Digital Multimeter
4. DC power supply

Components:

- NPN Transistor: C828 1pieces
- Diode 1N4003 2pieces
- Resistors

450 2 pieces
100K 1 piece
15K 1 piece
2.2K 1 piece

Circuit Diagram:



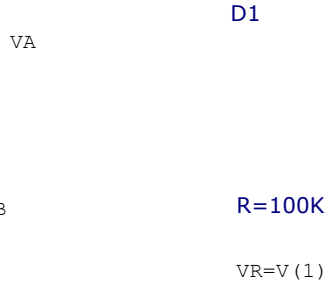


Fig 1: OR gate Fig 2: AND gate

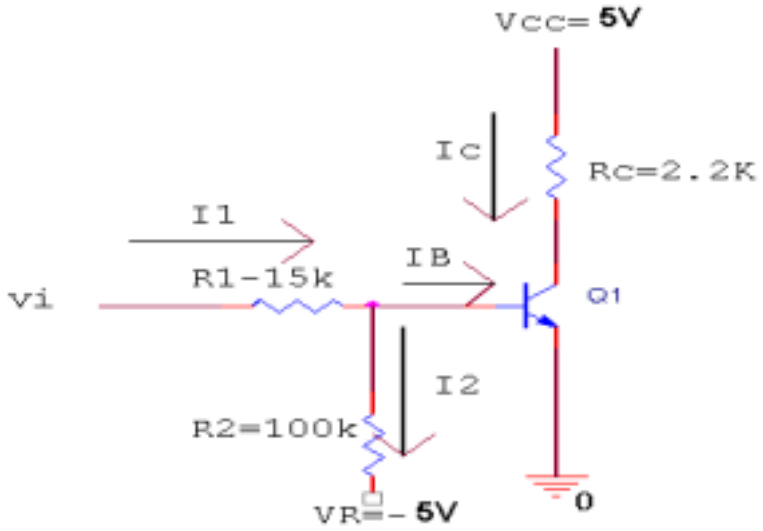


Fig 3: INVERTER for positive logic

Laboratory tasks:

1. Connect the circuit as shown in Fig: 1,2 & 3
2. Observe the output for all possible input combinations thus verify the type of gate. 3. Fill up the following table for OR gate, AND gate and inverter

V_A	V_B	V_{R1}	V_{R2}	I_{R1}	I_{R2}	V_R=Y

V_A	V_B	V_{R1}	V_{R2}	I_{R1}	I_{R2}	V_R=Y

OR Gate AND Gate

V_i	V_{R1}	V_{R2}	V_{RC}	I_1	I_2	I_B	I_C	Y

Inverter

Report:

1. What happens if not all inputs have the same upper level?
2. Will the diode D_1 and D_2 will work, if $V_A=V_B=6V$ and $V_R=5V$? (use Proteus to change input voltage levels and observe the output)
3. What is the function of R2 = 100k at the base of an inverter in figure 3? 4. Verify that the transistor will be operating in the saturation and cutoff region in two cases for the inverter circuit (Use Proteus Data for verification)
5. what is the function of -5V voltage source in the inverter circuit ?

Reference: Microelectronics: Digital and Analog Circuits and Systems by Jacob Millman. Page- 125-132