

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

Experiment No: 2
Implementing a DTL logic gate

Objective

1. Construct a DTL logic gate.
2. Understand the circuit operation.

Equipments:

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

Component:

- NPN Transistor: C828 1pieces
 - Diode 1N4003 4+pieces
 - Resistors
- | | |
|-----|----------|
| 2K | 2 pieces |
| 20K | 1 piece |

Circuit Diagram

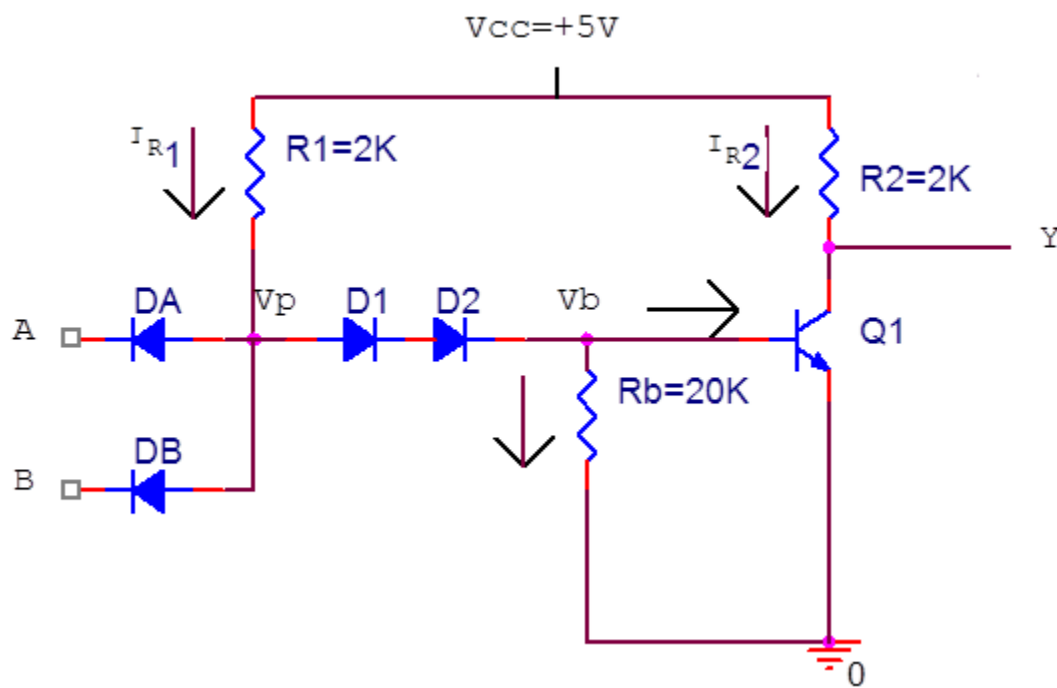


Fig: 1

Laboratory tasks

1. Connect the circuit as shown in Fig: 1.
2. Observe the output for all possible inputs and determine the type of gate.
3. Fill up the following table.

Input A	Input B	V_{DA}	V_{DB}	V_P	I_{R1}	I_{R2}	V_b	Output Y
0	0							
0	5							
5	0							
5	5							

4. Operate the gate in Fig 1 as an inverter by connecting either of the inputs to +5V and using the remaining one as input terminal. Fill up the following table.

Input A	Input B	V_P	V_b	Output Y
5	0			
5	5			

Report

1. Explain briefly how NAND operation is performed in the circuit.
2. Using experimental data, find the operation mode of Q1 when one of the inputs is **HIGH** and other one is **LOW**. Additionally, find whether diodes DA and DB are ON or OFF.
3. Assume that the output of the circuit shown in Fig: 1 is **LOW**. Draw the partial circuit consisting of only those components which remain active.

4. Explain the logic operation in table 2 (Laboratory task step 4). How did you reach that logic operation from the NAND operation of figure 1?
5. Compare the experimental values obtained in Laboratory task step 3 with the theoretical values.

Reference

Reference: Microelectronics: Digital and Analog Circuits and Systems by Jacob Millman,
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