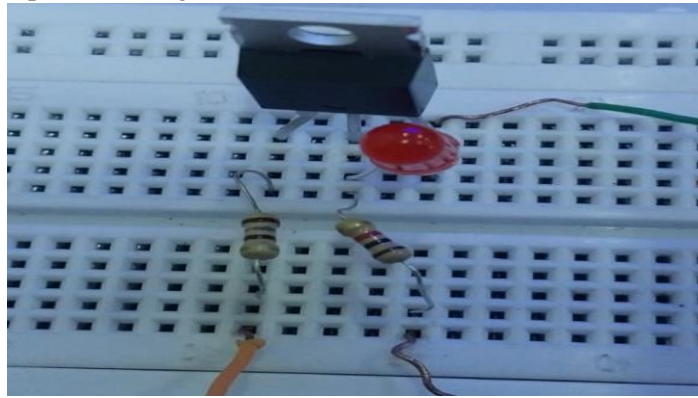


---

**Lab Manual****DSD Lab Manual Evaluation Rubrics**

Assessment	Total Marks	Marks Obtained	0-30%	30-60%	70-100%
Code Organization (CLO1)	3		No Proper Indentation and descriptive naming, no code organization.  Zero to Some understanding but not working	Proper Indentation or descriptive naming or code organization.  Mild to Complete understanding but not working	Proper Indentation and descriptive naming, code organization.  Complete understanding, and proper working
Simulation (CLO2)	5		Simulation not done or incorrect, without any understanding of waveforms	Working simulation with errors, don't cares's(x) and high impedance(z), partial understanding of waveforms	Working simulation without any errors, etc and complete understanding of waveforms
FPGA (CLO2)	2		Not implemented on FPGA and questions related to synthesis and implementation not answered.	Correctly Implemented on FPGA or questions related to synthesis and implementation answered.	Correctly Implemented on FPGA and questions related to synthesis and implementation answered.

**Circuit:** NOT gate circuit patched using IRF540n:



*From left to right the configuration is as Gate, Drain, Source.*

**Task 1: Apply 5V at terminal A, what is the voltage at terminal B? Does the LED glow?**

*No, the LED doesn't glow when 5 V is applied at terminal A and the Voltage at terminal B is 0 V.*

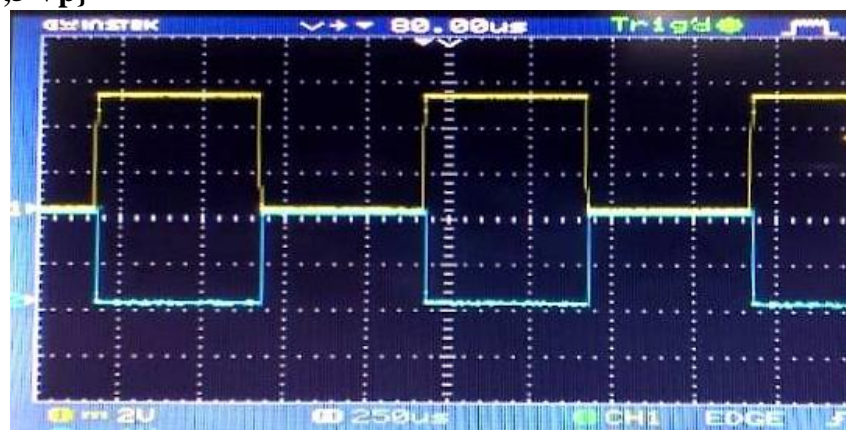


**Task 2: Apply 0V at terminal A, what is the voltage at terminal B? Does the LED glow?**

*Yes, the LED glows when 0 V is applied at terminal A and the Voltage at terminal B is 2.05 V.*

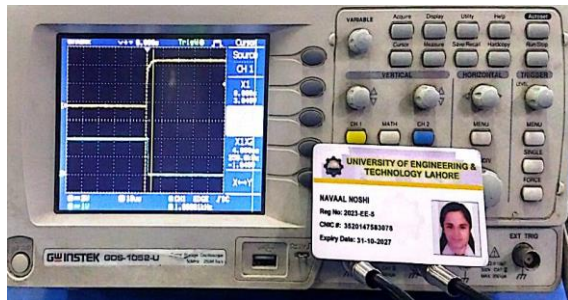


**Task 4: {1 KHz ,5 Vp}**

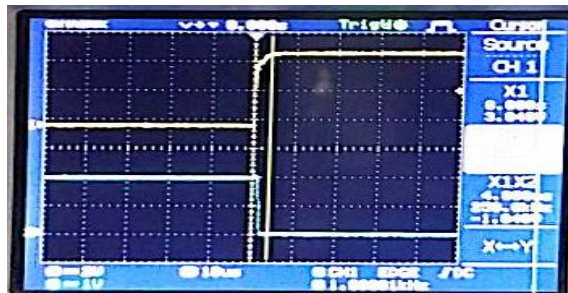




When the output goes from low to high the propagation delay is approximately is  $4.8\mu\text{s}$

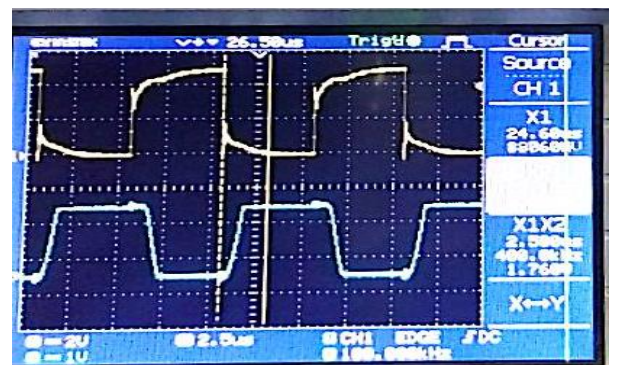
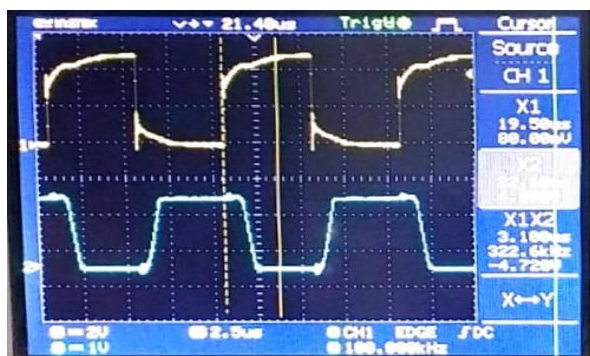
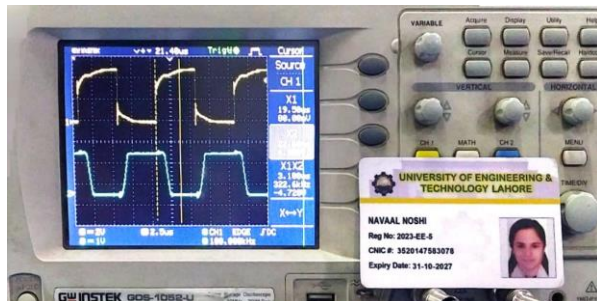


When the output goes from high to low the propagation delay is approximately is  $4.0\mu\text{s}$ .



#### Task 4: {100 KHz ,5 Vp}

When the output goes from low to high the propagation delay is approximately is  $3.1\mu\text{s}$



#### Task 5: How does the change of frequency affect the mode of operation of a transistor?

At low frequencies, a MOSFET works well, switching fully on and off. At higher frequencies, delays from internal capacitances slow it down, causing distorted output.