

BRAC UNIVERSITY
Department of Computer Science & Engineering
Practice Problem sheet
CSE 350: Digital Electronics and Pulse Technique

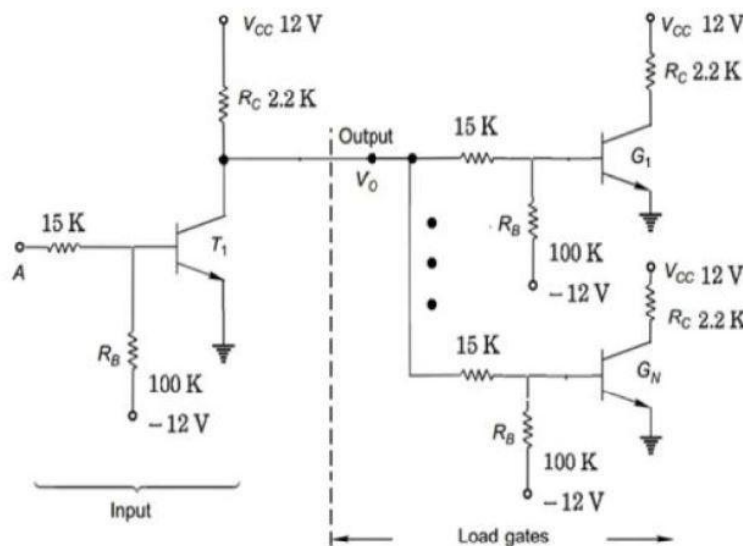
- Use activation voltage $V_{\gamma}(\text{diode}) = 0.6V$, $V_{\gamma}(\text{transistor}) = 0.5V$, $V_{BE}(\text{forward active}) = 0.7V$, $V_D = 0.7V$ and $V_{BE}(\text{sat}) = 0.8V$ for all the questions.

Week 2(DL and RTL)

Question No. 1

For the given RTL inverter circuit assume $V_{OH}=10V$ and $V_{OL}=0.2V$. Also assume common emitter current gain, $\beta_F=30$. Assume for saturation mode $V_{BE}=0.8V$, $V_{CE}=0.2V$ and cut in voltage for transistor $V_{\gamma}=0.5V$.

(a)	Find the Maximum possible Fanout.
(b)	Find the value of V_o if Fanout, $N=2$ (2 Load gates are connected) and input of Driver is Low.
(c)	If $V_{in} = \text{High}$, find the power dissipation in the Driver circuit. (assume No Loads are connected)
(d)	If $V_{in} = \text{High}$, find the power dissipation in the Driver circuit. (assume 50 Loads are connected)
(e)	If $V_{in} = \text{Low}$ and Fanout is 2, find the power dissipation in the Driver circuit.

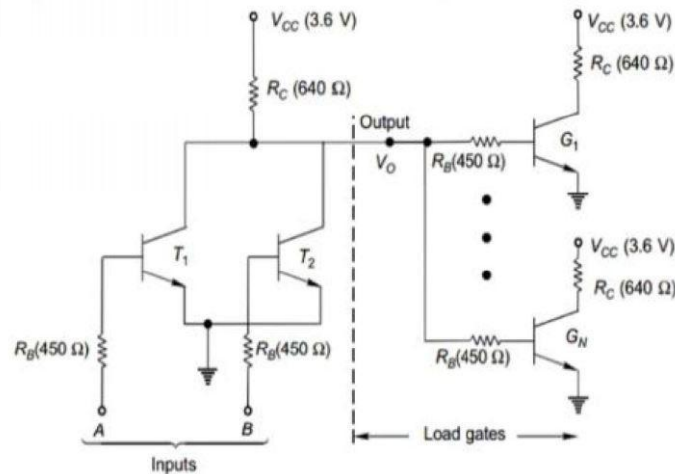


Question No. 2

For the given RTL inverter circuit assume $V_{OH}=1.3V$ and $V_{OL}=0.2V$. Also assume common emitter current gain, $\beta_F=30$. Assume for saturation mode $V_{BE}=0.8V$, $V_{CE}=0.2V$ and cut in voltage for transistor $V_{\gamma}=0.5V$.

(a)	Find the value of maximum fanout .
(b)	Find the value of V_o (output of Driver), if Fanout(N)= 5 and Inputs A, B are Low.

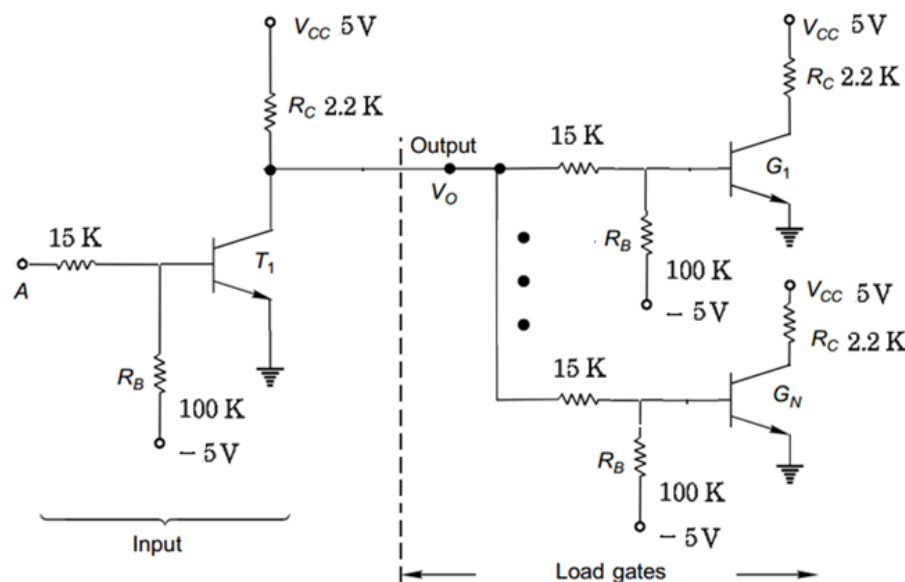
(c)	Find the value of β_{min} (for Load Gates), and Power dissipation in the Driver circuit for the conditions in (b).
(d)	Find the Power dissipation in the Driver circuit when both inputs (A and B) are High.



Question No. 3

For the given RTL inverter circuit assume $V_{OH} = 11.5 V$ and $V_{OL} = 0.2 V$. Also assume common emitter current gain, $\beta_F = 30$. Assume for saturation mode $V_{BE} = 0.8 V$, $V_{CE} = 0.2 V$ and cut in voltage for transistor $V_{\gamma_T} = 0.5 V$.

(a)	Find the value of V_{IL} in V.
(b)	Find the value of V_{IH} in V.
(c)	Find the value of Noise margin, V_N in V.



Question No. 4

For the given AND, if $V(0) = 0V$ and $V(1) = 5V$. And $R_s = 0.25\text{ k}\Omega$, $R = 100\text{ k}\Omega$. Fan In=2

(a)	Find out the output voltage levels.
(b)	Find the maximum power dissipation

