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ECE 442L
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Lab 2

Case 2:

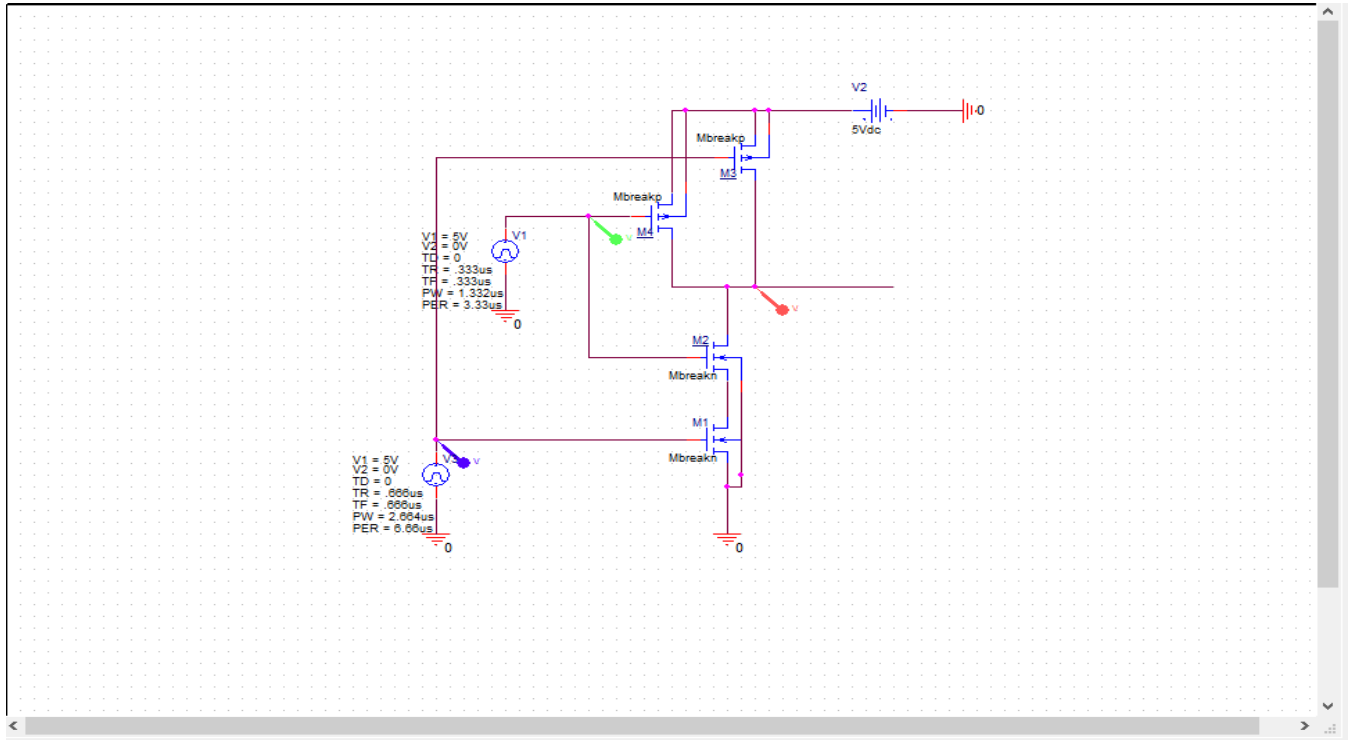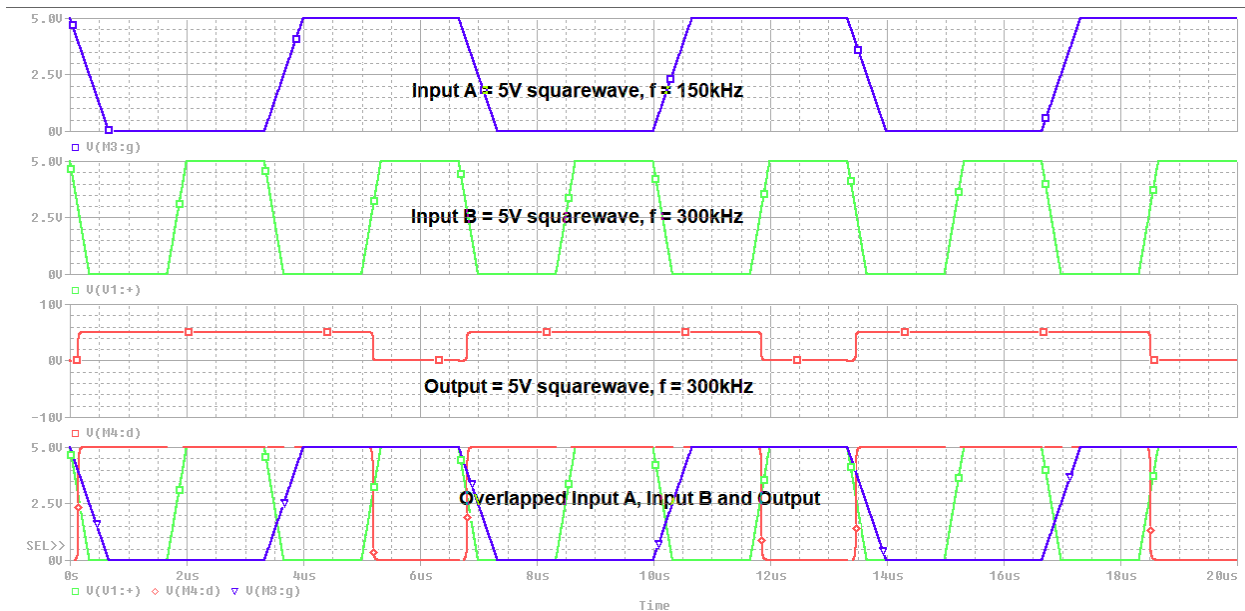**Figure 1: Circuit Schematic for 5V squarewave, f = 300kHz**

	Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)	-1.4791		
		X Values	13.419u	0.000	13.419u		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
	CURSOR 1,2	V(V1:+)	3.5209	5.0000	-1.4791		0.000	0.000	5.0000	3.5209	4.2605
		V(M4:d)	19.960m	-131.683u	20.092m		-3.5010	-5.0001	19.960m	-131.683u	9.914m
		V(M3:g)	4.2605	4.9999	-739.454m		739.529m	-75.075u	4.9999	4.2605	4.6302
		V(M4:d)	19.960m	88.496m	-68.535m		-3.5010	-4.9115	88.496m	19.960m	54.228m
		V(V1:+)	3.5209	4.9999	-1.4789		0.000	-150.150u	4.9999	3.5209	4.2604
		V(M3:g)	4.2605	4.9999	-739.454m		739.529m	-75.075u	4.9999	4.2605	4.6302

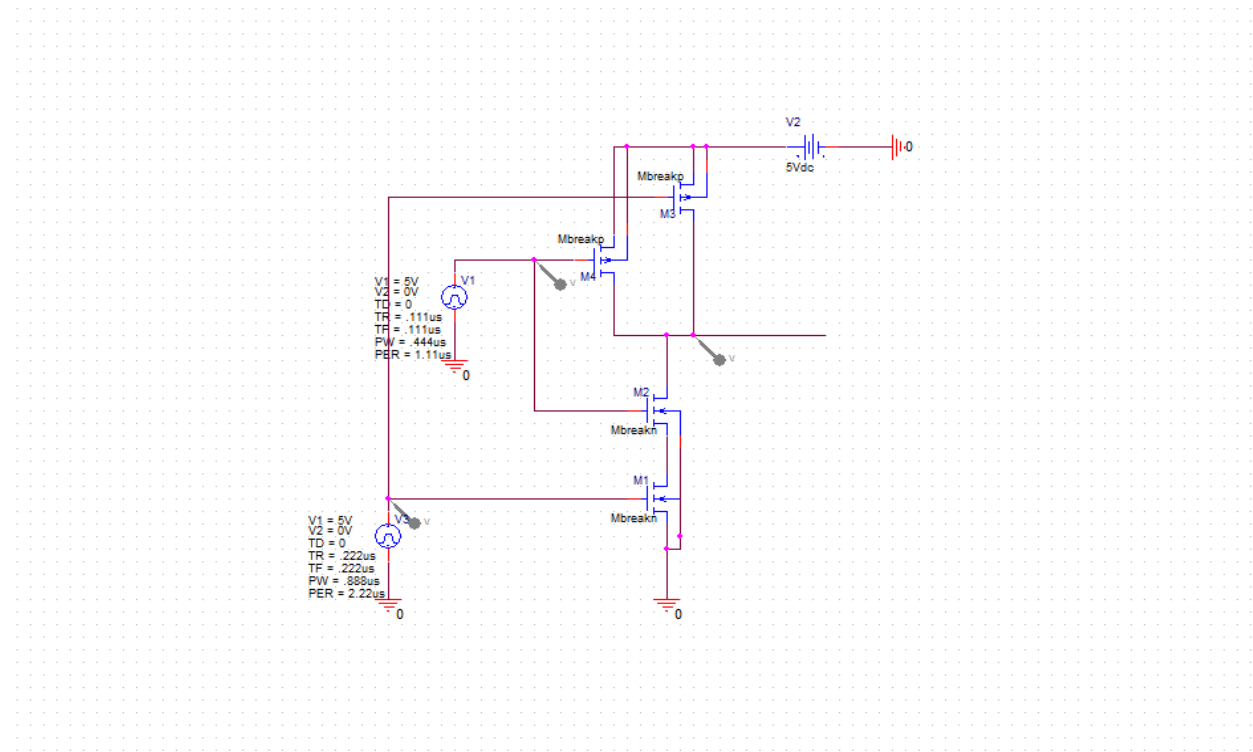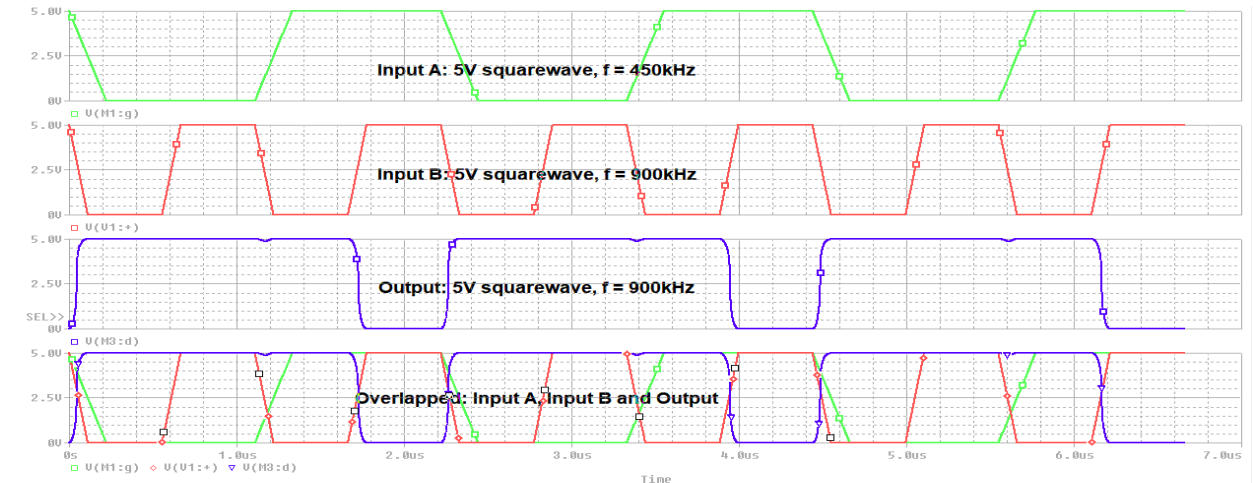**Figure 2: Output waveform for 5V squarewave, f = 300kHz**

Case 4:

Figure 3: Circuit Schematic for 5V squarewave, f = 900kHz

	Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)		0.000		
		X Values	1.7185u	0.000	1.7185u		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
	CURSOR 1,2	V(M1:g)	5.0000	5.0000	0.000		0.000	0.000	5.0000	5.0000	5.0000
		V(V1:+)	2.3650	4.9996	-2.6346		-2.6350	-450.450u	4.9996	2.3650	3.6823
		V(M3:d)	4.1224	251.143n	4.1224		-877.617m	-5.0000	4.1224	251.143n	2.0612
		V(M3:d)	4.1224	251.143n	4.1224		-877.617m	-5.0000	4.1224	251.143n	2.0612
		V(V1:+)	2.3650	4.9996	-2.6346		-2.6350	-450.450u	4.9996	2.3650	3.6823
		V(M1:g)	5.0000	4.9998	225.225u		0.000	-225.225u	5.0000	4.9998	4.9999

Figure 4: Output waveform for 5V squarewave, f = 900kHz

<u>Ramp Case:</u>

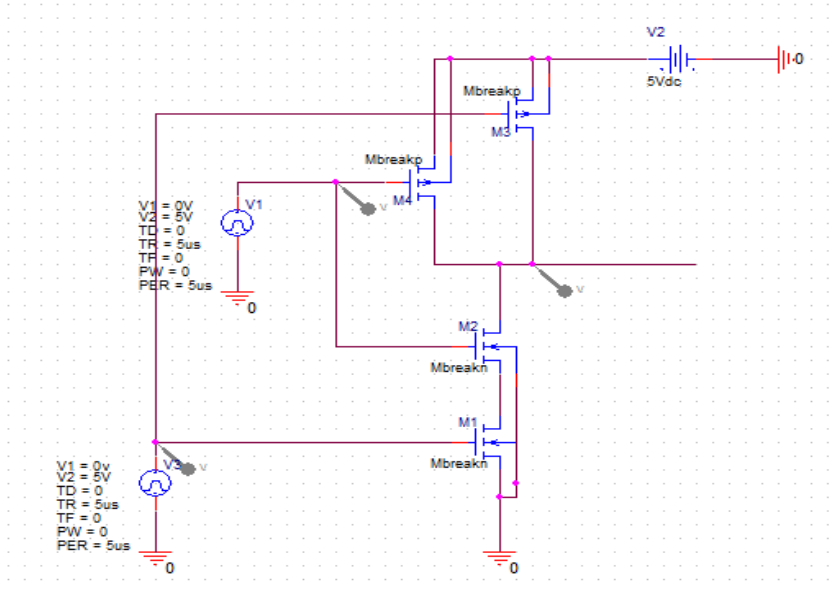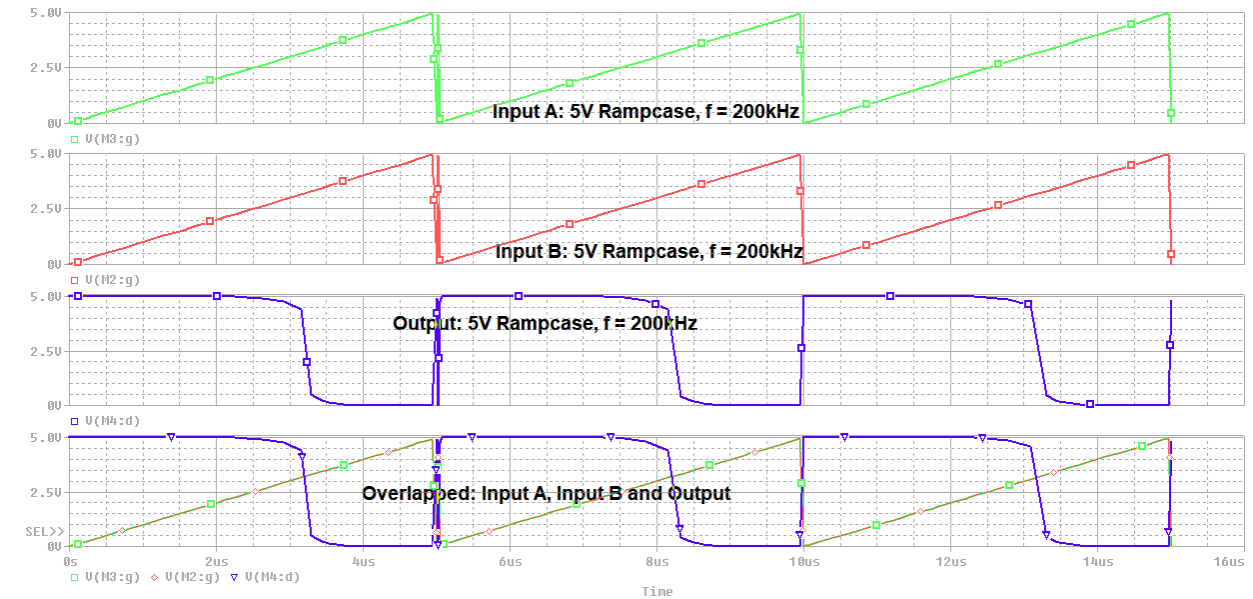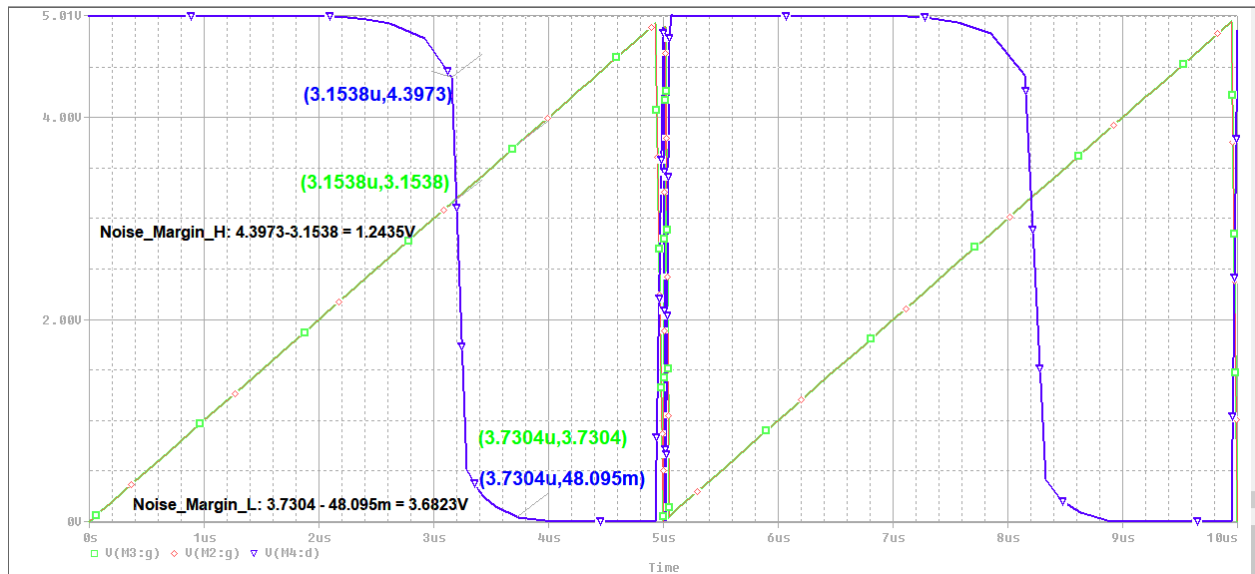**Figure 5: Circuit Schematic for 5V Ramp Case, f = 200kHz**

Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)		4.9331		
	X Values	4.9331u	0.000	4.9331u		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
CURSOR 1,2	V(M3:g)	4.9331	0.000	4.9331		0.000	0.000	4.9331	0.000	2.4665
	V(M2:g)	4.9331	3.0000m	4.9301		0.000	3.0000m	4.9331	3.0000m	2.4680
	V(M4:d)	1.7694m	5.0005	-4.9987		-4.9313	5.0005	5.0005	1.7694m	2.5011
	V(M4:d)	1.7694m	5.0005	-4.9987		-4.9313	5.0005	5.0005	1.7694m	2.5011
	V(M2:g)	4.9331	3.0000m	4.9301		0.000	3.0000m	4.9331	3.0000m	2.4680
	V(M3:g)	4.9331	3.0000m	4.9301		0.000	3.0000m	4.9331	3.0000m	2.4680

Figure 6: Output waveform for 5V Ramp case, f = 200kHz

(3.1538u,4.3973)

(3.1538u,3.1538)

Noise_Margin_H: 4.3973-3.1538 = 1.2435V

(3.7304u,3.7304)

(3.7304u,48.095m)

Noise_Margin_L: 3.7304 - 48.095m = 3.6823V

□ V(M3:g) ◇ V(M2:g) ▽ V(M4:d)

Time

Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)		3.1826		
	X Values	3.1826u	0.000	3.1826u		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
CURSOR 1,2	V(M3:g)	3.1826	0.000	3.1826		0.000	0.000	3.1826	0.000	1.5913
	V(M2:g)	3.1826	3.0000m	3.1796		0.000	3.0000m	3.1826	3.0000m	1.5928
	V(M4:d)	3.6167	5.0005	-1.3838		434.045m	5.0005	5.0005	3.6167	4.3086

Figure 7: Noise Margin waveform for ramp case, f = 200kHz