



INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA HIMACHAL PRADESH

An Institute of National Importance under MoE

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School of Electronics

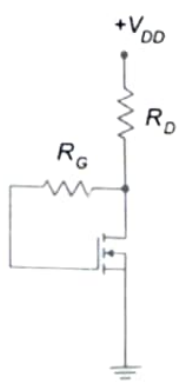
CURRICULUM: IITUGECE22

Cycle Test – II

09, Oct.'23

Time: 09:00-10:00AM

Degree	B.Tech.	Branch	ECE
Semester	VII		
Subject Code & Name	ECPE42: VLSI Design		
Time: 60 Minutes	Answer All Questions	Maximum: 20 Marks	

Sl. No.	Question	Marks
1.a	What is the difference between Ratioed and Ratioless logic.	1
1.b	Explain why Pseudo NMOS might be preferred in certain applications despite its drawbacks as compared to the CMOS logic? Draw the circuit of 3-input NOR and AND gate with the pseudo NMOS.	2
1.c	How is NORA CMOS logic used for pipelined systems? Design the 8-bit input OR gate using the Zipper NORA CMOS logic.	2
2.a	Explain the basic principle of Transmission Gate (TG).	1
2.b	Explain the advantage of Domino CMOS over static CMOS. Implement the Boolean function $Y = AB' + (C + D')(E + F) + (G + H)$ using Domino CMOS.	2
2.c	Enlist the difference between pass transistor and Transmission Gate (TG). Implement the EX-OR and 4×1 Mux function using the TG.	2
3.a	Explain the methods to overcome the charge sharing problem in dynamic CMOS logic.	1
3.b	Determine values for R_D and R_G for the circuit shown in Figure 1, such that the drain current is 8 mA, $V_{DD} = 20V$, $V_{GS(th)} = 2.5V$, and $I_{D(on)} = 5mA$ at $V_{GS(on)} = 4V$. <div style="text-align: center;">  <p>Figure 1</p> </div>	2
3.c	Define the term Logical effort and electrical effort. Determine the W/L ratio of each PMOS and NMOS transistor of 3-input NAND and NOR gate using the Logical effort method.	2
4.a	Compare and contrast the characteristics of MOSFET amplifier with BJT amplifier.	1

4.b

Find the relation between output V_1 and V_2 for MOSFET amplifier given in Figure 2 using the small signal analysis.

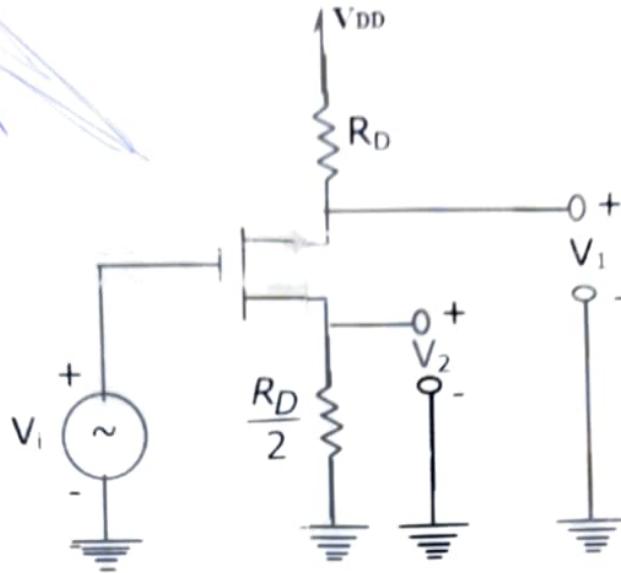


Figure 2

4.c

A common source N-MOSFET amplifier is to be constructed which has a conduction parameter of 50mA/V^2 and a threshold voltage of 2.0 volts. If the supply voltage is +15 volts and the load resistor is 470 Ohms, calculate the values of the resistors required to bias the MOSFET amplifier at $1/3(V_{DD})$ and draw the circuit diagram.

**** GOOD LUCK ****