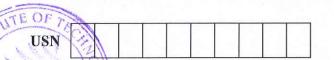
(10 Marks)

## PImportant Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



## Fourth Semester M.Tech. Degree Examination, June/July 2019 Advances in VLSI Design

RANGALTime: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

		Note. Answer any 11v L jun questions.	
1	a.	Explain the operation of MESFET under different bias conditions.	(10 Marks)
1	b.	Determine Pinch off voltage in a MESFET.	(05 Marks)
	c.	Bring out the differences between cmos and Bicmos.	(05 Marks)
2	a.	What are the properties of ideal MIS system in equilibrium? Explain energy bar	nd diagram
4	a.	for an ideal MIS structure in equilibrium.	(10 Marks)
	b.	Calculate the threshold voltage for an 'n' channel MIS device given the	
		$N_a = 10^{17} \text{cm}^{-3}$ , $Q_i = 10^{11} \text{ q/cm}^2$ , $d = 20 \text{nm}$ and $\phi_{ms} = -0.95 \text{ V}$ , $K_i = 3.9$ , $n_i = 1.0$	
			(10 Marks)
3	a.	Describe the small signal model for a MOSFET. Obtain the expression for cutoff	frequency.
			(10 Marks)
	b.	Calculate the cutoff frequency of a MOSFET. Given the following information	
		n channel device with a p-type substrate ; $\mu_n' = 1200$ cm <sup>2</sup> /vs, $z = 10L$ ; $V_T = V_T = 5V_T$	
	c.	$V_G = 5V$ . Find the maximum width of depletion region for an ideal mos capacitor on p-typ	(04 Marks)
	C.	strong inversion given that the doping concentration is 10 <sup>16</sup> cm <sup>-3</sup> and relative	e dielectric
		constant is 11.8. Given $n_i = 1.0 \times 10^{10}$ cm <sup>-3</sup> .	(06 Marks)
4	a.	What are the important features that arise in short channel MOSFET? Explain	
		detail.	(10 Marks)
	b.	Write a note on scaling theory.	(10 Marks)
5	a.	Mention and discuss the advantages of feature of molecular material which can be	
		bio-molecules.	(10 Marks)
	b.	With the help of neat diagram, explain the construction and working of carbon FET. List out its advantages.	(10 Marks)
		FET. Eist out its advantages.	(10 Marks)
6	a.	Derive an expression for the minimum total delay when a series of superbuffe	ers used to
	C	drive targe capacitive loads.	(08 Marks)
	b.	Explain with circuit diagram the Bicmos implementation of 2 input NAND gate.	(07 Marks)
	c.	With the help of truth table, maps and nmos realization, design a pass transistor lo	
		NAND gate.	(05 Marks)
7	a.	Write down the block diagram, truth table output expression of a 4:1 MU	JX and its
		implementation in NOR and NAND modes.	(10 Marks)
	b.	Explain 3 input Tally circuit with truth table and stick diagram.	(10 Marks)
8	a.	Discuss structured design technique in detail.	(10 Marks)
-	h	Write a note on Full custom design	(10 Marks)

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Write a note on Full custom design.