

AC-1586

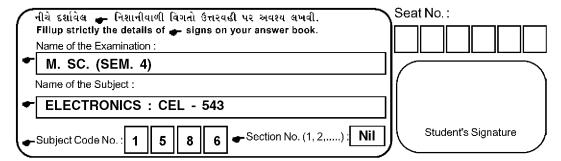
M. Sc. (Sem. IV) Examination April / May - 2015

Electronics: CEL - 543 (Analog & Digital Circuits)

Time: 3 Hours [Total Marks: 70

Instructions:

(1)



- (2) Figures to the right hand side indicate full marks.
- (3) Assume data if required.
- (4) Symbols have their usual meaning.
- (5) Simple calculator is allowed to use.
- 1 Attempt any two:
 - (a) Sketch the diagram of MOSFET and explain its working in the enhancement mode. Also derive the equation for its volt-ampere characteristics.

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- (b) Describe the working and application of CMOS devices with the help of suitable example.
- (c) What are dynamic MOS Shift registers? Explain the working of NMOS dynamic shift register with the help of a suitable block diagram and truth table mention the applications of these registers.
- **2** Attempt any two:
 - (a) Describe the use of VLSI planner process to prepare and integrate a FET on a silicon chip.

	(b)	(b) Describe how will you prepare the following con		
		(i)	IC resistors	
		(ii)	IC capacitors	
	(c)	(i)	Write a note on integrated circuit packaging.	3
		(ii)	What is the total length required to fabricate 25 k.ohm register whose width is $25\mum$. If Rs=200 ohm/square.	4
3	Attempt any two:			
	(a)	Explain why the quiescent collector current must be essentially independent of variations in BF to achieve bias stabilization. Derive the formula for IC dependence on $B_F,\ V_{BE}$ and $I_{CO}.$		
	(b)	(i)	What is meant by zero frequency resistance R_{ii}^{o} ?	3
		(ii)	Explain pole-zero method for amplifier having two poles in detail.	4
	(c)	(i)	Explain dominant pole method explain its significance for high frequency response.	3
		(ii)	(a) For the Widlar circuit, determine R so that $I_C = 1 \text{ mA}$. The transistor parameters are VBE=0.7 V, BF=100 and an infinite Early voltage is assumed. The supply voltage is 15V.	3
			(b) For R obtained in part (a), determine the present change in $I_{\rm C}$ for $B_{\rm F}$ = 200.	4
4	Attempt any two:			
	(a)	Explain the following terms:		
		(i)	Multiloop feedback amplifier.	
		(ii)	Stability	
		(iii)	open loop poles.	
	(b)	Explain test for stability with Nyquist's criterion. 7 Comment on your result.		
	(c)		at is 't' model, Derive equations for t parameters erms of xi, xi, xs and xo.	7

5 Attempt any two:

- (a) Draw an ideal characteristic of an Inverter. 7

 How such characteristics are possible in NMOS technology. Explain such circuit in detail.
- (b) List the limitations of PROM. Explain their operation with detail architecture.
- (c) (i) Explain PLA or PAL. 3
 - (ii) Consider a 4kb ROM with 4 output bits. If 4 the encoder is square, how many bits are needed for x address.