

Q.P. Code : 719703

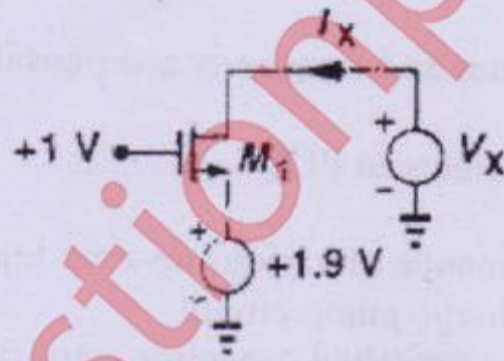
(3 Hours)

Total Marks : 80

- Note : 1) Question ONE is compulsory  
2) Solve any THREE out of remaining questions  
3) Draw neat and clean diagrams  
4) Assume suitable data if required.

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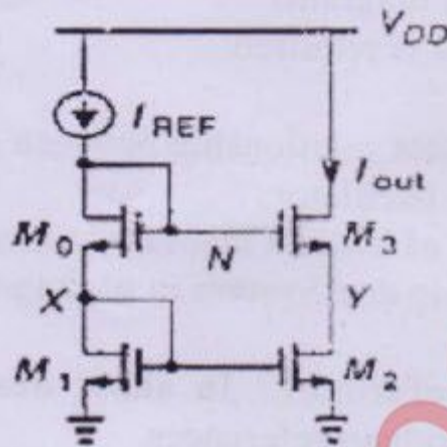
1. A. Establish the appropriate relationship between  $g_m$  and  $R_{on}$  for MOSFET. 5  
B. Draw and explain LC oscillator. 5  
C. Explain the necessity of Millers theorem with suitable example. 5  
D. Explain System on chip and System in package. 5
2. A. What is bandgap reference? In short describe various methods of implementation of bandgap references. 10  
B. Draw and explain common gate circuit. 5  
C. Sketch  $I_x$  and the transconductance of the transistor as a function of  $V_x$  for each circuit in the given figure as  $V_x$  varies from 0 to VDD. For part (a) assume  $V_x$  varies from 0 to 1.5V. 5



3. A. Write qualitative analysis of input-output characteristics of a differential pair. Also mention about common mode characteristics for the same. 10  
B. Write in detail about speed considerations of a switch capacitor circuit. 10

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4. A. In the following Figure, sketch  $V_x$  and  $V_y$  as a function of  $I_{REF}$ . If  $I_{REF}$  requires 0.5V to operate as a current source, what is its maximum value? Assume: for all transistors  $(W/L)=25/0.5$ ,  $\mu_n C_{ox} = 50 \mu A/V^2$ ,  $V_{TH}=0.6V$ ,  $\lambda=\gamma=0$  and  $V_{DD}=3V$ . 10



- B. Explain the following for op-amp 5  
 I. CMRR      II. Input Range Limitation
- C. Explain the white noise and flicker noise in case of MOSFET. Explain which noise is dominant when? 5
5. A. Discuss stability issues and frequency compensation of two stage operational amplifier. 10  
 B. Explain Non-ideal effects in PLL. 10
6. A. Compare the performance of various op-amp topologies. 5  
 B. Draw and explain charge pump circuit. 5  
 C. Explain noninverting switched capacitor amplifier circuit. 5  
 D. Draw and explain AMS design flow. 5

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