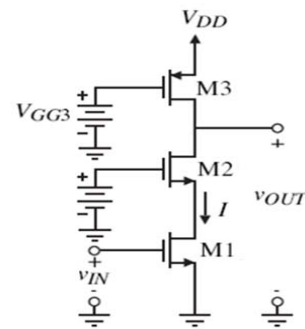


**GUJARAT TECHNOLOGICAL UNIVERSITY****M.E –II<sup>st</sup> SEMESTER–EXAMINATION – JULY- 2012****Subject code: 1724205****Date: 127/2012****Subject Name: Analog and Mixed Signal VLSI Design****Time: 10:30 am – 13:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain Diode Reference Self Biasing. **07**  
 (b) Explain the significance of class AB CMOS amplifier. **07**

- Q.2** (a) Explain Miller Compensation. **07**  
 (b) The Specification of cascade amplifier are **07**  
 $A_v = -50$  V/V,  $V_{out(max)} = 4$  V and  $V_{out(min)} = 1.5$  V,  
 $V_{DD} = 5$  V, and  $P_{diss} = 1$  mW. The slew rate with  
 a 10 pF load should be 10 V/ $\mu$ s or greater.  
 Design a cascade amplifier with above  
 specification.  $V_{tn} = 0.7$  V,  $V_{tp} = -0.7$  V,  
 $k_n' = 110 \mu\text{A/V}^2$ ,  $k_p' = 50 \mu\text{A/V}^2$ ,  $\lambda_n = 0.04 \text{ V}^{-1}$ ,  
 $\lambda_p = 0.05 \text{ V}^{-1}$ ,  $2|\Phi_F| = 0.7$  V and 0.8 V for n-  
 channel and p-channel respectively.

**OR**

- (b) Draw and explain cascade amplifier using small circuit and hence derive **07**  
 the formula of small signal voltage gain and -3dB bandwidth.
- Q.3** (a) Explain the working of Flash ADC. **07**  
 (b) Using the small signal diagram derive the voltage gain and -3dB frequency **07**  
 of Active pMOS load inverter

**OR**

- Q.3** (a) Discuss Current Steering DAC. **07**  
 (b) What is oversampling? Explain Sigma Delta ADC **07**
- Q.4** (a) Define the following with respect to Differential Amplifier. **07**  
 (i) CMRR (ii) ICMR (iii) Output Offset Voltage (iv) Input Offset Voltage  
 (v) Differential mode voltage (vi) common mode voltage (vii) slew rate.  
 (b) Explain Sense Amplifier? **07**

**OR**

- Q.4** (a) Discussed Phased Frequency Detector **07**  
 (b) Explain MOSFET-Only Voltage Divider. **07**

- Q.5** (a) Define the following specification of ADC **07**  
 (i) Missing Codes (ii) Offset and Gain Errors (iii) INL (iv) DNL (v) SNR  
 (b) Draw and explain current source load inverter using small circuit and **07**  
 hence derive the formula of small signal voltage gain and -3dB bandwidth.

**OR**

- Q.5** (a) Discuss layout techniques for improving matching of the device used as **07**  
 current mirror.  
 (b) Explain Wilson Current Mirror **07**

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