CMR INSTITUTE OF TECHNOLOGY	USN										

Internal Assesment Test - II

Sub:	MICROELECTRONICS CIRCUITS							Code:	15EC655
Date:	22/ 05/2018	Duration:	90 mins	Max Marks:	50	Sem:	VI	Branch:	Professional Elective

Answer Any FIVE FULL Questions

		Marks	OBE CO	OBE RBT
1.	Consider a common-gate amplifier with active loads specified as follows: W/L= 7.2µm/0.36µm, $\mu_n C_{ox}$=387 µA/V^2, r_0=18 kΩ, I_D=100µA, gm=1.25mA/V, χ= 0.2, R_S=10 kΩ, R_L=100 kΩ, C_{gs}=20fF, C_{gd}=5fF and C_L = 0. Find A_{vo}, R_{in}, R_{out}, G_v, G_{is}, G_i and f_H.	[10]	CO1	L1
2.(a)	Explain the working of MOS differential pair with proper diagram.	[05]	CO2	L1
(b)	Derive the expression of differential gain of MOS differential pair. Also explain the effect of ro.	[05]	CO2	L3
3.	Explain CMOS implementation of CS amplifier with circuit diagram and voltage transfer characteristics.	[10]	CO1	L1

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2.(a) Explain the working of MOS differential pair with proper diagram. [05] CO2 L1

(b) Derive the expression of differential gain of MOS differential pair. Also explain the effect of ro. [05] CO2 L3

3. Explain CMOS implementation of CS amplifier with circuit diagram and voltage transfer characteristics. [10] CO1 L1

4.	Explain the working of MOS differential pair with common-mode input and differential input.	[10]	CO1	L2
5.	For a MOS differential pair with common-mode voltage V_{cm} applied, when $V_{DD}=V_{SS}=1.5v$, $kn'(W/L)=4mA/V^2$, $V_t=0.5V$, $I=0.4mA$, $R_D=2.5K\Omega$, $\lambda=0$ calculate the following: a)V_{OV}, V_{GS} for each transistors b) V_S, I_{D1}, I_{D2}, V_{D1}, V_{D2} when $V_{CM}=0$ c) highest value of V_{CM} for which Q_1 & Q_2 remains in saturation.	[10]	CO1	L3
6.a)	A MOS differential pair is operated at a total bias current of I=0.8mA using transistor with W/L=100, $\mu_nC_{OX}=0.2mA/V^2$, V_A = 20V. Calculate V_{OV}, gm, ro, $A_{d.}$	[05]	CO2	L2
b)	Derive the expression of Rin, Rout and A_{VO} of MOS Cascode amplifier with suitable diagram.	[05]	CO1	L1

4.	Explain the working of MOS differential pair with common-mode input and differential input.	[10]	CO1	L2
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b).	Derive the expression of Rin, Rout and A_{VO} of MOS Cascode amplifier with suitable diagram.	[05]	CO1	L1