BE/ETRX/SEM-VIII (CBSGS)/CMOS VLSI Design/MAY-17

Q. P. Code: 11132

[Time: 3 Hours] **[Total Marks: 80]**

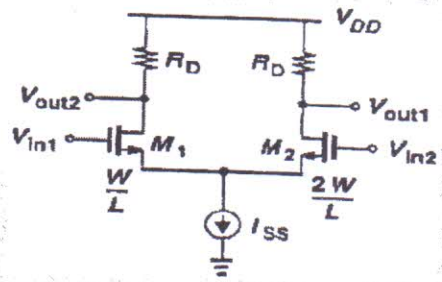
Note: 1) Question ONE is compulsory

2) Solve any THREE out of remaining questions

3) Draw neat and clean diagrams, wherever necessary

4) Assume suitable data, if required

1 (a) Analyze following circuit to get voltage gain equation if M2 is twice wide as that of M1 and Vin1=Vin2 5



(b) Explain importance of Miller Theorem 5

(c) List the non-ideal effects in Charged Pump circuit and justify how it impacts the PLL performance 5

(d) With the help of suitable circuit diagram, **Justify True or false**: Cascode current mirror current matching performance is better than Basic current mirror. 5

2 (a) Derive expression for Voltage gain Av and output resistance Ro of Source follower stage. 10

(b) Explain in detail how to generate temperature independent references. 10

3 (a) Explain the concept of clock feed through in Charged Pump , Charge injection Charge Sharing in Charged Pump 10

(b) Explain the concept of switched capacitor circuit. Draw and explain discrete time integrator along with the output waveform 10

4 (a) Explain common mode response of differential pair with necessary derivations 10

(b) Explain White & Flicker noise in MOSFET. Derive equation for output and input referred noise voltage of CS stage 10

TURN OVER

5 Design two stage Operational Transconductance Amplifier (OTA) to meet following specifications-. 20

$A_V > 4000$ V/V , V_{DD} =2.5V, Vss=-2.5V GBW = 6MHz, C_L =10pF,

SR > 10V/μs, 60° phase margin, -2V≤ V_{out} range≤2V,

ICMR = -1.125V to 2V, P_{diss} ≤2.5mW

Use, $K_{N'}$=110μA/V^2, $K_{P'}$= 50μA/V^2, $V_{TN} = |V_{TP}| = 0.7$V, $\lambda_N = 0.04V^{-1}$, $\lambda_P = 0.05V^{-1}$, Cox=2.47fF/μm^2. Verify that the designed circuit meets required Voltage Gain and Power Dissipation specifications.

6 (a) Give comparison between Full-custom and Semi-custom design

(b) Compare various opamp topologies

(c) Compare the performance of Ring and LC oscillators in terms of phase noise, area, Q factor and application.

(d) Derive the expression of input referred noise voltage of common source stage

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Q. P. Code:-17036

Note1) Q1 is compulsory .Answer any three from remaining questions
2) All question carry equal mark

Q1. Answer any four 20

(a) Write a short note on Bluetooth security
(b) Advantage and Disadvantage of DWDM
(c) Write a short note on virtual private network
(d) With the respect to network management explain the OAMP
(e) Draw and Explain the ATM cell Format

Q2. (a) Explain ATM adaptation layer with respect to service and protocol 20

(b) Explain the DWDM technology in detail, with a neat schematic diagram of DWDM architecture .

Q3 (a) Explain in detail SNAT and DNAT. 20
(b)Draw and Explain IEEE802.15.4 LR – WPAN device architecture

Q4 (a) Draw and Explain frame format of frame relay and address fields how it provides congestion control and quality of service 20

b) Draw and Explain the frame format of STS -1

Q5(a) What is Firewall ? What are the capabilities and limitation of firewall? Discuss the different types of firewall 20
(b) write a short note on SNMP

Q6 (a) Write a short note on Packet Filtering and Port Forwrding 20
(b) Explain Network Security Safeguards in detail

ETRX / Sem-VIII / [CBSGS] T5028 / T1785 MEMS TECHNOLOGY / MAY-2017

Q.P. Code :08594

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1. Q.1 is compulsory.
2. Attempt any three out of remaining questions.
3. Assume suitable data wherever required.

Q.1	a)	Explain various micro – actuation techniques pertaining to MEMS technology.	20
	b)	Explain the role of MEMS sensors in IoT.	
	c)	Define TCR, thermal conductivity and its significance with respect to MEMS devices.	
	d)	Explain DRIE in detail.	
Q.2	a)	Explain fabrication steps of thermal Ink – jet printer head by Hewlett – packard and explain its ink – firing sequence.	10
	b)	What do you understand by high aspect ratio MEMS? Explain fabrication process flow for HARMEMS.	10
Q.3	a)	How MEMS pressure sensor converts pressure into its equivalent electrical parameter, explain with its schematic representation and fabrication process steps.	10
	b)	Define reliability? Draw and explain bath – tub – curve, describing MEMS devices reliability.	10
Q.4	a)	Differentiate between surface and bulk micromachining for fabrication of MEMS devices with suitable example.	10
	b)	"Silicon based microelectronics is different than MEMS fabrication" Justify the statement.	10
Q.5	a)	What are polymers? Discuss role of SU8 and PMMA polymers in MEMS applications.	10
	b)	List out various silicon compounds. Explain their characteristics and uses in MEMS device fabrication.	10
Q.6	Write short note on (any two)		20
	a)	Wire bond techniques	
	b)	MEMS accelerometer	
	c)	Lithography (any one type in detail)	

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BE/ETRX/Sem-VIII (CBSGS)/Mobile Communication/May-17

Q. P. Code : 728304

(3 Hours) [Marks : 80]

N. B.: (1) Question **No.1** is compulsory.
(2) Out of the remaining questions attempt any **three.**
(3) Figures in the bracket indicate maximum marks.

1. Answer any 4 the following: 20
   (a) If 20MHz of total spectrum is allocated for a duplex wireless cellular system and each simplex channel has 25kHz RF bandwidth, find the number of duplex channels and the total number of channels per cell if i) N=4 cell reuse is used, ii) N=12 cell reuse is used.
   (b) Explain authentication and security in GSM.
   (c) Compare the WCDMA and IS-95 technologies.
   (d) Explain the need for 3G cellular networks.
   (e) Differentiate between soft hand off and hard han doff.

2. (a) Explain the coverage and capacity improvement techniques for cellular systems. 10
   (b) Explain different traffic channels and control channels in GSM. 10

3. (a) Explain GSM frame and time slot structure. 10
   (b) Explain GSM architecture in detail. 10

4. (a) Explain mobility and radio resource management in CDMA. 10
   (b) Explain variable data transmission and power control in CDMA. 10

5. (a) Discuss the services provided by CDMA 2000 cellular technology. 10
   (b) Explain GRPS network architecture. 10

6. (a) Explain 4G LTE architecture giving a neat block diagram. 10
   (b) Explain the Ad-hoc routing protocols for MANET. 10

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BE/ETRX/Sem-VIII(CBSGS)/Robotics/May-2017

Q. P. Code: 13597

(3 hours) [80M]

N. B
1. Question No. 1 is compulsory.
2. Attempt any three questions from the remaining five questions.
3. Assume suitable data if necessary.
4. Figures to the right indicate full marks

Q.1
a. Explain classification of Robots. (5M)
b. Explain with suitable example iterative processing. (5M)
c. Define Kinematic parameters. (5M)
d. Explain the term singularities. (5M)

Q.2
a. Develop D.H algorithm for 4-axis SCARA robot, write its parameter table and find its arm matrix. (12M)
b. Let F= $\{f^1, f^2, f^3\}$ and M= $\{m^1, m^2, m^3\}$ be initially coincident fixed and mobile orthonormal coordinate frames, respectively. Suppose we perform a screw transformation along axis f^2 translating by $\lambda = 3$ and rotation by an angle of $\pi/2$. Find $[m^3]^F$ following the screw transformation, and determine the pitch of the screw. (8M)

Q.3
a. With a suitable example explain differential motions of a frame with respect to (12M)
1. Differential translation
2. Differential rotation
3. Differential transformations

b. Explain Jacobian matrix and calculate the linear and angular differential motions of the robot's hand frame for the given joint differential motions. (8M)

$$J = \begin{pmatrix} 2 & 0 & 0 & 0 & 1 & 0 \\ -1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \qquad D_\Theta = \begin{pmatrix} 0 \\ 0.1 \\ -0.1 \\ 0 \\ 0 \\ 0.2 \end{pmatrix}$$

Q.4
a. Give Comparison between Bug Algorithms. (10M)
b. Derive the dynamic equation of motion using Newton-Euler formulation. (10M)

Q.5
a. Explain Joint-space versus Cartesian-Space Descriptions (10M)
b. What is Visibility graph? Explain algorithm to construct visibility graph. (10M)

(20M)

Q.6 Write short note on

a. Template matching
b. Path versus Trajectory
c. Generalized Voronoi diagram
d. Inverse Kinematic of Robot