Sem - VIII

25/11/2016

ETRX (CBGS)

CMOS VLSI Design

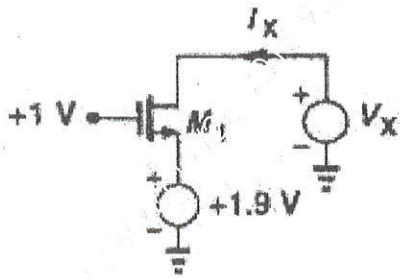
Q.P. Code : 719703

(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.

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 Ix and the transconductance of the transistor as a function of Vx for each circuit in the given figure as Vx varies from 0 to VDD. For part (a) assume Vx 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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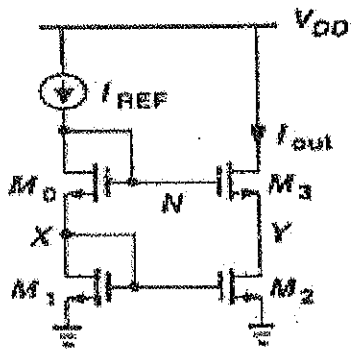
4. A. In the following Figure, sketch V_X and V_Y as a function of I_{REF}. If I_{REF} requires O.5V to operate as a current source, what is its maximum value? Assume: for all transistors (W/L)=25/0.5, $\mu_n C_{ox}$= 50 μA/V^2, V_{TH}=0.6V, λ=γ=O and V_{DD}=3V. **10**



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**

Sem-VIII

ETRX (CBGS)

ANT

16/12/2016

28

Q.P. Code : 733703

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **compulsory**.
(2) Solve **any three** from remaining.

1. Solve **any four** : **20**
   (a) Write a short note on frame relay.
   (b) What do you mean by Network layer design ?
   (c) What is wireless sensor network ?
   (d) Explain with diagram frame format of SO NET.
   (e) What is Roll of VCI & VPI in ATM ?

2. (a) What is a firewall ? What are the capabilities & limitation of firewall ? Discuss the different type of firewall, along with their advantage & disadvantage. **10**
   (b) Explain the hardware implement of SONET architecture. **10**

3. (a) Explain the protocol stack for IEEE 802.15.1 standard. **10**
   (b) Draw and explain IEEE 802.15.4 LR-WPAN device architecture. **10**

4. (a) Explain ATM cell format. Also describe the different functional layers of ATM and bring out the significance of AAL layer. **10**
   (b) Draw and explain frame format of FR & explain address fields. How it provides congestion control and QoS. **10**

5. (a) Explain Demilitarized Zone (DMZ) in brief. **10**
   (b) What is the need of DWDM? Explain the technology with a neat schematic diagram, also list the system components. **10**

6. Write a short note (**any four**) : **20**
   (a) RMON and FCAPS
   (b) Packet filtering
   (c) B-ISDN
   (d) NAT
   (e) Port forwarding

Sem - VIII

ETRX (CBGS)

MEMS Technology

9/12/2016

Q. P. Code : 731500

3 Hours | Max Marks: 80

N.B.

1) Q. No. 1 is compulsory.
2) Attempt any three out of remaining questions.
3) Assume any suitable data wherever required but justify the same.

1	a	Justify the statement that silicon based microelectronics is different than micro-fabrication (MEMS fabrication).	20
	b	State various Chemical Vapor Deposition Techniques. Explain in brief any one of the techniques of Chemical Vapor Deposition for MEMS device fabrication.	
	c	Define Piezo-resistive property of single crystal silicon as MEMS material. Also define and justify that semiconductor material has high Gauge factor.	
	d	What is the resonant frequency F_0 for the silicon cantilever beam of 2000μm long and 200μm wide and 1.5μm thick?(Data : for silicon E = 190 GPa and The density is 2.39 g/cm^3)	
2	a	Explain transduction pertaining to capacitive measurement, Piezo-resistive for MEMS. Also state different parameters on which this transduction depend.	10
	b	Discuss fabrication process for DMD. Justify clearly choice of material, process parameters & sub-type of processes preferred	10
3	a	Justify the need of vacuum pressure in Physical Vapor Deposition (PVD).	10
		Explain in brief any one of the techniques of PVD for MEMS device fabrication. Also define the terms step coverage and shadowing.	10
	b	Describe the representative process flow for fabricating the micro-heater. Also explain the operating principle of this MEMS device in detail with its analytical expression.	
4	a	Explain the process Integration for typical MEMS Device	10
	b	Give two examples of combination of structural , sacrificial layers and enchants used in MEMS fabrication along with their applications	10
5	a	Explain what do you mean by Wafer bonding? State the need of the same. What are the different types of Wafer bonding?	10
	b	Discuss MEMS reliability in detail.	10
6		Write a short note on (any three)	20
	a	Plasma Etching	
	b	Advantages and limitations of surface micromachining	
	c	High Aspect Ratio MEMS	
	d	DMD (Digital Mirror Device)	

Sem - VIII

2/12/2016

ETRX (CBGS)

13

Mobile Communication

QP Code : 728301

(3 Hours) **[Total Marks :80**

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt **any three** questions out of the remaining **five** questions.
(3) Assume suitable data wherever needed.

1. Answer **any four** of the following:
   (a) What is meant by term umbrella cell and micro-cell in a cellular systems. **5**
   (b) A large city with an area of 1500 km^2 is needed to be covered by a finite number of cells with a radius of 2km each. How many cell sites would be required assuming regular hexagonal shaped cells? **5**
   (c) Differentiate between CDMA, TDMA and FDMA. **5**
   (d) Explain the different handoff strategies from IG to 3G. **5**
   (e) What is RFID and what is the difference between active and passive RFID tags? **5**

2. (a) Explain the GSM network architecture with a neat block diagram. **10**
   (b) What is frequency reuse? How does it influence the co channel interference? What is the advantage of frequency reuse? **10**

3. (a) A spectrum of 30 MHz is allocated to a wireless FDD cellular system which uses two 25 kHz simplex channels to provide full duplex voice and control channels. Compute the number of channels available per cell if a system uses, a) four cell reuse, b) seven cell reuse, c) 12 cell reuse and d) 13 cells reuse. **10**
   (b) Compare GSM and CDMA technologies. **10**

4. (a) Explain IS-95 forward and reverse channels. **10**
   (b) What is WCDMA air interface? Give important parameters of it. **10**

5. (a) Describe UMTS technology with a neat block diagram. **10**
   (b) Write a detailed note on LTE. **10**

6. Write short notes on **any four** of the following:
   (a) Wireless sensor networks **5**
   (b) Speech coding in GSM **5**
   (c) Mobile IP **5**
   (d) IMT 2000 **5**
   (e) WiMax **5**

Sem-VIII

ETRX (CBGS)

Robotics

2/12/2016

12

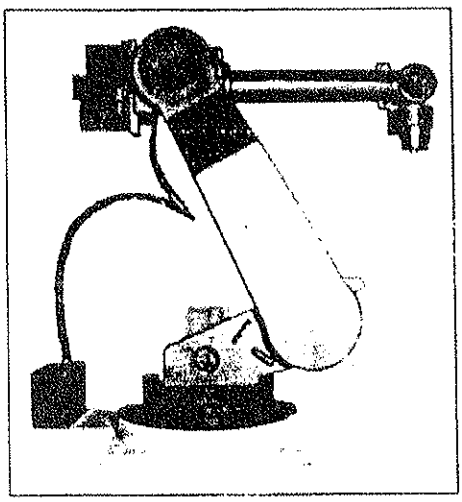
QP CODE : 732401

(3 Hours) [Total Marks: 80]

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. Answer following questions in brief.

a Draw the approximate workspace for the following robot. Assume the dimensions of the base and other parts of the structure of the robot are as shown below. (05)

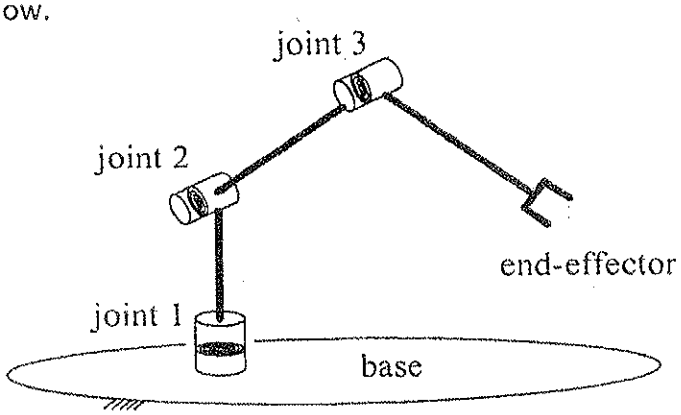


b What is a homogeneous transformation matrix? Give the transformation matrix for pure translation and rotation matrix about y-axis. (05)

c Discuss wave-front planner in brief. (05)

d What is Histogram? Explain the use of Histogram in image processing. (05)

Q.2. a A 3-DOF robot arm has been designed for applying paint on flat walls, as shown below. (12)



- Assign coordinate frame as necessary based on the D-H representation
- Write parameter table
- Find the ${}^{0}T_{H}$ matrix.

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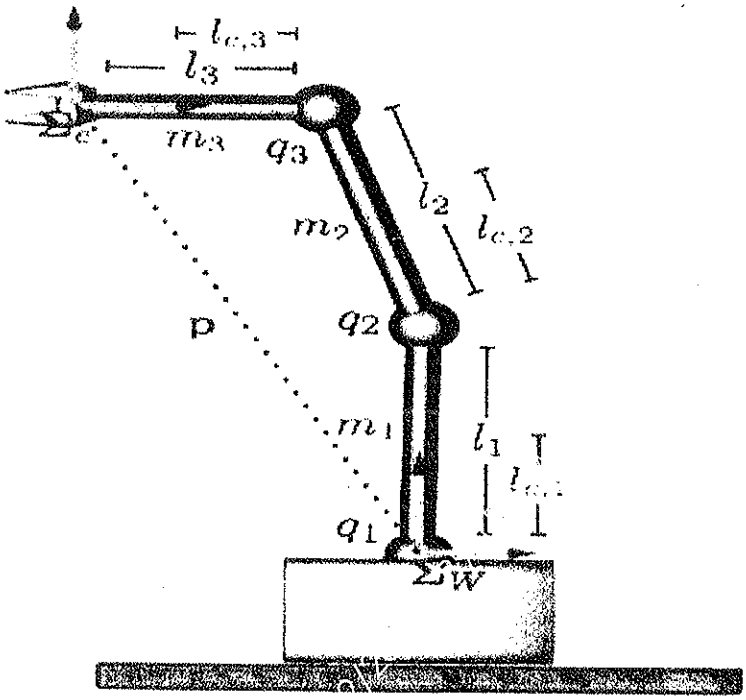
b Define the following terms (08)
- Roll, Pitch and Yaw angles
- Euler angles
- Articulated joints

Q.3. a Discuss differential rotation about reference axes. (08)

b Derive the equations of motion for the system shown below: (12)



Q.4. a Explain Bug1 algorithm and compare it with Bug2 algorithm. (10)

b Explain how you will use attractive/repulsive potential function method to handle moving objects. (10)

Q.5. a What is visibility graph? Explain algorithm to construct visibility graph. (10)

b Differentiate between (10)
I. Path versus trajectory
II. Joint space versus Cartesian space

Q.6. Write short notes on
a Trajectory planning (05)
b Robot applications (05)
c Potential function in non-Euclidean spaces (05)
d Construction of GVD (05)

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