BE | SEM-VIII | ETRX | CMOS VLSI Design | NOV-16
(CBSGS)

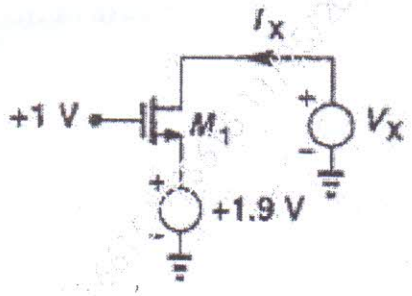
Q.P. Code : 719703

(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**

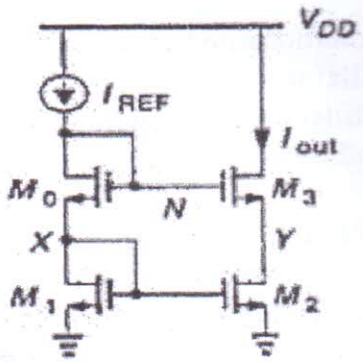
2. A. What is bandgap reference? In short describe various methods of implementation of bandgap references. **10**
   B. Draw and explain common gate circuit. **5**
   C. Sketch Ix and the transconductance of the transistor as a function of Vx for each circuit in the given figure as Vx varies from 0 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**

[TURN OVER]

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**

B E / SEM VIII (CBSGS) / ETRX NOV/DEC '16

ADV. NETWORKING TECH.

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

E / SEM. VIII (CBSGS) / ETRX / Robotics / Nov-16

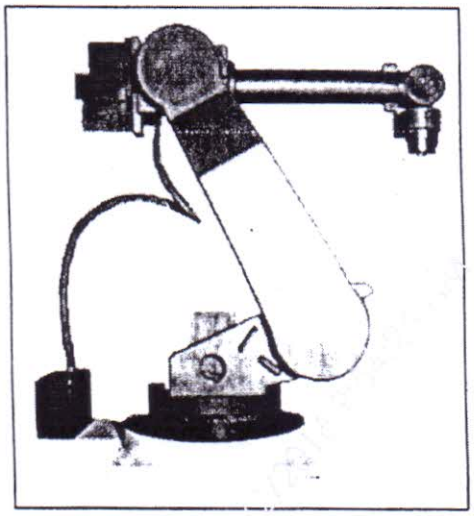
QP CODE : 732401

(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)

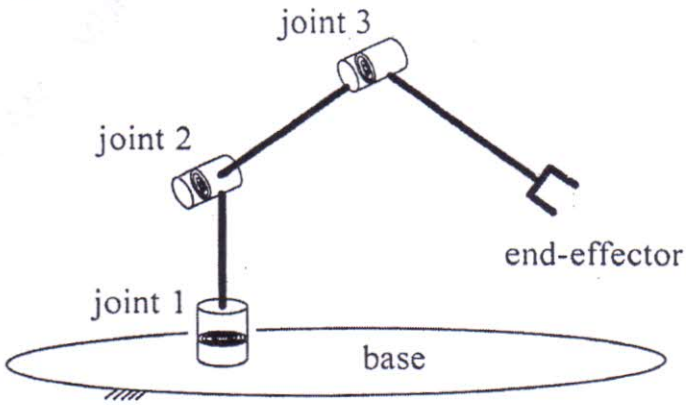


b What is a homogeneous transformation matrix? Give the transformation matrix for pure translation and rotation matrix about y-axis. (05)

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)



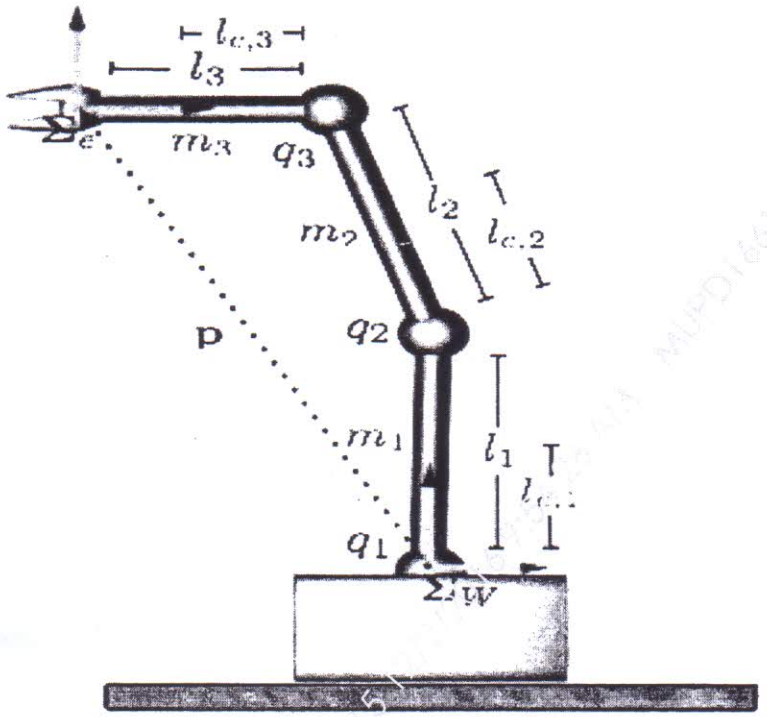
- Assign coordinate frame as necessary based on the D-H representation
- Write parameter table
- Find the ${}^{U}T_{H}$ matrix.

[TURN OVER

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)



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)

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

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)

---------- xxx ----------