ETRX

TE Sem-VI (ETRX) R-19

Basic VLSI

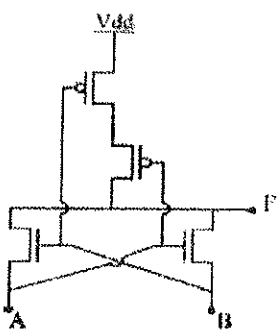
QP code - 92057

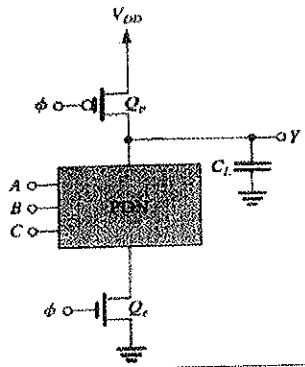
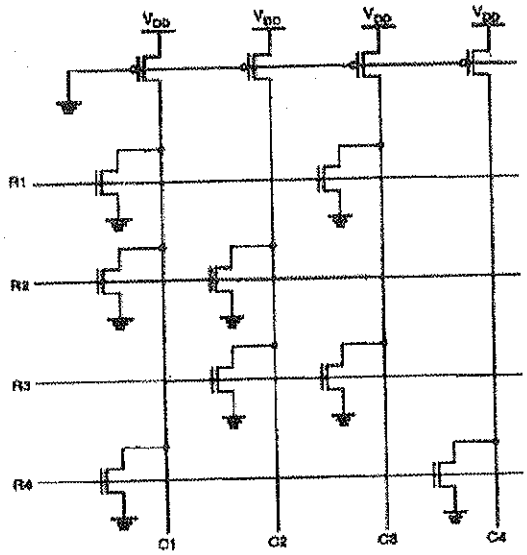
University of Mumbai

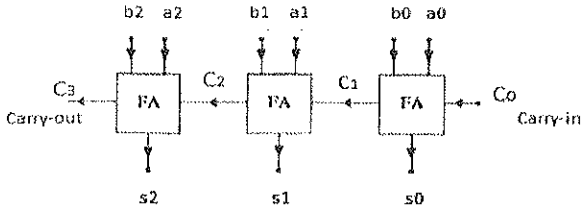
Examinations Summer 2022

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1	Which condition is true for scaling factor S:
Option A:	S<1
Option B:	S=1
Option C:	S=0
Option D:	S>1
2	If the Noise Margin of the circuit increases then Noise Immunity
Option A:	Increases
Option B:	Decreases
Option C:	No change
Option D:	All of the above
3	How many MOS require for designing 2-i/p NAND Gate using static CMOS Design Style.
Option A:	NMOS-1, PMOS-2
Option B:	NMOS-2, PMOS-2
Option C:	NMOS-1, PMOS-1
Option D:	NMOS-2, PMOS-1
4	For a symmetric CMOS inverter, which condition is true?
Option A:	$(W/L)_P = 1.5\ (W/L)_N$
Option B:	$(W/L)_N = 1.5\ (W/L)_P$
Option C:	$(W/L)_P = 2.5\ (W/L)_N$
Option D:	$(W/L)_N = 2.5\ (W/L)_P$
5.	CMOS domino logic is the same as _____ with an inverter at the output line.
Option A:	clocked CMOS logic
Option B:	dynamic CMOS logic
Option C:	gate logic
Option D:	switch logic
6	In the circuit shown, A and B are the inputs and F is the output. What is the functionality of the circuit? 
Option A:	XOR
Option B:	SRAM Cell
Option C:	Latch

Option D:	NOR
7	Following diagram represents which design style : 
Option A:	CMOS Domino Logic
Option B:	CMOS static logic
Option C:	Pass transistor logic
Option D:	CMOS Dynamic Logic
8	In the following circuit if R1, R2, R3, R4 logic level is 0001 then C1,C2,C3,C4 logic level will be 
Option A:	0101
Option B:	0011
Option C:	0110
Option D:	1001
9	All DRAM requires periodic refreshing of data because
Option A:	Stored data can be modified
Option B:	Data stored as charge in a capacitor can't be retain indefinitely
Option C:	Stored data can be erased
Option D:	Data can be written in memory

10.	 Adder circuit shown in the above fig. is..... where a_n and b_n are input bits and C_n & S_n arecarry and sum respectively.
Option A:	3bit Carry look ahead adder
Option B:	4 bit Carry look ahead adder
Option C:	3 bit Ripple Carry Adder
Option D:	4 bit Ripple Carry Adder

Q2	**Solve any Four out of Six** **5 marks each**
A	Compare Bipolar, NMOS and CMOS technologies.
B	Compare SRAM and DRAM.
C	Design a 4:1 MUX using nMOS pass transistor logic.
D	Draw VTC of CMOS inverter. Show all critical voltages in it.
E	Compare Static CMOS, Dynamic CMOS and Pseudo nMOS logic.
F	Explain basic Manchester Carry Circuit with suitable diagram.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Calculate noise margin of a CMOS inverter with the given parameters: NMOS $V_{To,n}$=0.6V , k_n=200uA/V^2, PMOS $V_{To,p}$=-0.7V , k_p=80uA/V^2, V_{DD}= 3.3V.
B	Implement the following function Y=(A+B)(C+D)E using: I) Static CMOS Logic II) Dynamic CMOS Logic III) Pseudo nMOS Logic
C	Draw 6T SRAM cell structure using MOS. Explain read, write and hold operations in detail.

Q4	
A	**Solve any Two** **5 marks each**
i.	Design a 4*4 NAND based ROM, which stores the following words: Row(0) 1000 Row(1) 1111 Row(2) 0111 Row(3) 1110
ii.	Design a half adder using Transmission Gate logic.
iii.	Compare Constant Voltage scaling and Full scaling with respect to following MOS parameters: Oxide Capacitance, Packing Density, Power Dissipation, Drain current and Saturation Current.
B	**Solve any One** **10 marks each**
i.	Explain 4 bit CLA adder with its carry equation. Draw the logical network using dynamic CMOS logic.
ii.	Design Master slave JK Flip Flop using any MOS Design Style.

EL
ETRX TE Sem -VI R-19 ETRX Machine Learning
QP code - 93775

University of Mumbai

Examinations Summer 2022

Time: 2 hour 30 minutes Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Machine learning is a branch of..
Option A:	Artificial intelligence
Option B:	speech processing
Option C:	Language processing
Option D:	java
2.	What does K stand for in K mean algorithm?
Option A:	Number of Clusters
Option B:	Number of Data
Option C:	Number of Attributes
Option D:	Number of Iterations
3.	Feature selection tries to eliminate features that are
Option A:	Rich
Option B:	important
Option C:	Irrelevant
Option D:	Relevant
4.	During the treatement of cancer patients , the doctor needs to be very careful about which patients need to be given chemotherapy. Which metric should we use in order to decide the patients who should given chemotherapy?
Option A:	precision
Option B:	recall
Option C:	call
Option D:	score
5.	Targetted marketing, Recommended Systems, and Customer Segmentation are applications in which of the following
Option A:	Supervised Learning: Classification
Option B:	Unsupervised Learning: Clustering
Option C:	Unsupervised Learning: Regression
Option D:	Reinforcement Learning
6.	CART stands for…
Option A:	classification and regression tree
Option B:	choosing a regression task
Option C:	classification and regression task
Option D:	classification along regression task
7.	Naïve Bayes Algorithm is a ..... learning algorithm.
Option A:	Supervised
Option B:	Reinforcement
Option C:	Semi supervised
Option D:	Unsupervised

8.	Which of the following can only be used when training data are linearly separable?
Option A:	linear hard-margin svm
Option B:	linear logistic regression
Option C:	linear soft margin svm
Option D:	the centroid method
9.	Impact of high variance on the training set ?
Option A:	depents upon the dataset
Option B:	underfitting
Option C:	both underfitting & overfitting
Option D:	overfitting
10.	What do you mean by a hard margin?
Option A:	The SVM allows very low error in classification
Option B:	The SVM allows very high error in classification
Option C:	The SVM allows no error in classification
Option D:	The SVM does not allow error in classification

Q2. (20 Marks Each)	**Solve any Two Questions out of Three** **10 marks each**
A	Explain the steps of developing Machine Learning applications in detail.
B	Explain regression line, scatter plot, error in prediction ; best fitting line.
C	Cluster the following eight points (with (x, y) representing locations) into three clusters: A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9) Initial cluster centers are: A1(2, 10), A4(5, 8) and A7(1, 2). The distance function between two points a = (x1, y1) and b = (x2, y2) is defined as- $d(a, b) = \|x2 - x1\| + \|y2 - y1\|$ Use K-Means Algorithm to find the three cluster centers after the one iteration
Q3. (20 Marks Each)	**Solve any Two Questions out of Three** **10 marks each**
A	Compare and contrast Linear and Logistic regressions with respect to their mechanisms of prediction.
B	Explain in detail PCA for dimension reduction.

C

Find complete linkage method of hierarchical clustering to find clusters of 5 data points with following distance matrix.

	1	2	3	4	5
1	0	9	3	6	11
2	9	0	7	5	10
3	3	7	0	9	2
4	6	5	9	0	8
5	11	10	2	8	0

Q4. (20 Marks Each)

Solve any Two Questions out of Three **10 marks each**

A

Explain K-mean clustering algorithm giving suitable example. Also, explain how K-mean clustering differs from hierarchical clustering.

B

What is support vector machine? What do you mean by support vectors, hyper plane and margin,support vectors?What will be the boundary for one dimensional data, two dimensional data and three dimensional data. Explain with suitable examples.

What is SVM? Explain the following terms: hyperplane, separating hyperplane, margin and support vectors with suitable example.

C

Create a decision tree using gini index to classify following dataset:-

Sr. No.	Income	Age	Own house
1	Very high	Young	Yes
2	High	Medium	Yes
3	Low	Young	No
4	High	Medium	Yes
5	Very high	Medium	Yes
6	Medium	Young	Yes
7	High	Old	Yes
8	Medium	Medium	No
9	Low	Medium	No
10	Low	Old	No
11	High	Young	Yes
12	Medium	Old	No

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University of Mumbai

Examinations Summer 2022

Program: **Electronics Engineering**

Curriculum Scheme: Rev2019

Examination: TE Semester VI

Course Code: ELC603 and Course Name: Computer Communication Networks

Time: 2 hour 30 minutes Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Network topology in which you can connect each node to the network along a single piece of network cable is called
Option A:	Star topology
Option B:	Bus topology
Option C:	Mesh topology
Option D:	Ring topology
2.	Which OSI layer is known as Medium Access control Layer (MAC)
Option A:	Physical Layer
Option B:	Application Layer
Option C:	Transport Layer
Option D:	Data Link Layer
3.	Which of the following best suits the User Datagram Protocol (UDP)
Option A:	Unreliable
Option B:	Congestion Control
Option C:	Flow Control
Option D:	Velocity Control
4.	What is the size of the IP address of IPv4 in bytes?
Option A:	32
Option B:	16
Option C:	4
Option D:	10

QP code – 93509

5.	In the network layer which addressing is done?
Option A:	Physical addressing
Option B:	Logical addressing
Option C:	Port addressing
Option D:	Specific addressing
6.	Which of the following is used for short range communication?
Option A:	Fiber optic cable
Option B:	Infrared wave
Option C:	microwave
Option D:	Coaxial cable
7.	The transition from IPv4 to IPv6 is not possible from the following strategies
Option A:	Dual Stack
Option B:	Subnetting
Option C:	Tunneling
Option D:	Header translation
8.	In _____, the chance of collision can be reduced if a station senses the medium before trying to use it
Option A:	MA
Option B:	CSMA
Option C:	CDMA
Option D:	FDMA
9.	Data field is not present in following frame
Option A:	I-frame
Option B:	U-frame
Option C:	S-frame
Option D:	A-Frame

10.	Simple Mail Transfer Protocol (SMTP) is_____
Option A:	Pull Protocol
Option B:	Push Protocol
Option C:	Forward Protocol
Option D:	Backward Protocol

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Describe different Addresses (MAC address, IP address, Port address, Specific address) used in networking with examples
B	Describe ADSL with respect to channel configuration, Modulation technique and Equipment setup
C	Explain Stop-And-Wait ARQ Protocol & list the advantages & disadvantages of Stop-And-Wait ARQ Protocol

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Draw and explain IPV4 header. Compare IPV4 with IPV6
B	Explain TCP/IP Protocol Suite. Distinguish between OSI model and TCP/IP model
C	Explain Sliding window flow control protocol with the help of suitable diagram

Q4	**Solve any Two Questions out of Three** **10 marks each**
A	What are causes & effects of Congestion in the Transport layer? Explain different congestion control mechanisms
B	Explain Time Slot Interchange Switch with the help of suitable diagram
C	Explain Domain Name System (DNS) in application layer with the help of suitable diagram

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QP code - 93463

University of Mumbai
Examination 2022 under Cluster
(Lead College:)
Examinations Commencing from 17th May 2022

Program: **Electronics Engineering**

Curriculum Scheme: Rev-2019

Examination: **T.E. Semester VI**

Course Code: **ELC602** Course Name: **Electromagnetic Engineering**

Time: 2:30-hour Max. Marks: 80

N.B. Use Smith Chart to solve transmission line Problem

Q1	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks** **(20 Marks)**
1.	Find the force in N between Q1 = 2C and Q2 = -1C separated by a distance 1m in air.
Option A:	18×10^{6} N
Option B:	-18×10^{6} N
Option C:	18×10^{-6} N
Option D:	-18×10^{-6} N
2.	Gauss's law is true only if force due to a charge varies as
Option A:	r^{-1}
Option B:	r^{-3}
Option C:	r^{-2}
Option D:	r^{-4}
3.	Find the displacement current when the flux density is given by t^3 at 2 seconds
Option A:	12
Option B:	6
Option C:	3
Option D:	27
4.	The magnetic vector potential for a line current will be inversely proportional to
Option A:	dl
Option B:	I
Option C:	J
Option D:	R
5.	Displacement current depends on
Option A:	Moving Charges
Option B:	Change in time
Option C:	Moving Charges and Change in time
Option D:	Differential Moving Charges and cumulative time period
6.	The inductance of single-phase, two-wire transmission line per kilometer gets doubled when the
Option A:	Distance between the wires is increased as square of original distance

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Option B:	Distance between the wires is doubled
Option C:	Distance between the wires is increased four fold
Option D:	Radius of the wire is doubled
7.	The characteristic impedance of a transmission line with impedance and admittance of 16 Ω and 9 ℧ respectively is
Option A:	0.75
Option B:	1.33
Option C:	7
Option D:	25
8.	The ratio of radiation intensity in a given direction from antenna to the radiation intensity over all directions is called as
Option A:	Gain of antenna
Option B:	Radiation power density
Option C:	Array Factor
Option D:	Directivity
9.	In which of the following the power is radiated through a complete spherical surface
Option A:	Half-wave dipole
Option B:	Quarter-wave Monopole
Option C:	Both Half-wave dipole & Quarter-wave Monopole
Option D:	Full wave dipole
10.	The effects of EMI can be reduced by
Option A:	Suppressing emissions
Option B:	Reducing the efficiency of the coupling path
Option C:	Suppressing emissions, Reducing the efficiency of the coupling path and Reducing the susceptibility of the receptor
Option D:	Increasing the efficiency of the coupling path and emissions

Q2.	**Solve any Two of the Following** **20 Marks**
A	Derive an expression of Electric Field Intensity due to infinite line charge at any point P on z-axis.
B	A lossless transmission line with Zo = 50 Ω is 30 m long and operates at 2 MHz. The line is terminated with a load $Z_L = 60 + j40$ Ω. If u 5 0.6c on the line, where c is velocity of light. Use Smith Chart to find (a) The reflection coefficient Γ (b) The standing wave ratio s (c) The input impedance Z_i
C	Write Maxwell's equations in time harmonic field form

Q3.	**Solve any Two of the Following** **20 Marks**
A	State and explain Maxwell's equations for differential and integral form for static field.
B	State Poynting theorem and derive an expression for the Poynting vector. Explain the power terms mentioned in the derivation

C	Derive an expression for transmission line equation for two wire line problem.

Q4.	**Solve any Two of the Following** **20 Marks**
A	Explain the terms radiation pattern, directivity, Beam-width and directive gain of the antenna.
B	Explain in detail the sources and the characteristics of EMI. EMI control techniques.
C	Write Short Notes on: (1) Horn Antenna (2) Microstrip Antenna