Examinations Commencing from 1st JUNE 2021 to 8th JUNE 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2012

Examination: BE Semester VIII

Course Code: EXC801 and Course Name: CMOS VLSI DESIGN

1T01118 / B.E.(ELECTRONICS)(SEM VIII) (CBSGS)

Paper code: 53001

Time: 2 hour   Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	In Basic current mirror circuit, copied current is considered
Option A:	with channel length modulation
Option B:	without channel length modulation
Option C:	with hot electron effect
Option D:	with subthreshold conduction
2.	A Bandgap voltage reference is-
Option A:	a temperature independent voltage source
Option B:	a temperature dependent voltage source
Option C:	a pressure dependent voltage source
Option D:	a humidity dependent voltage source
3.	The "start-up" problem occurs in-
Option A:	Temperature dependent current source generation
Option B:	Temperature dependent voltage source generation
Option C:	Supply dependent current source generation
Option D:	Supply independent current source generation
4.	VBE voltage of a transistor has _____temperature coefficient
Option A:	Positive
Option B:	Negative
Option C:	Zero
Option D:	Infinity
5.	To generate temperature independent references _____are preferred
Option A:	BJT
Option B:	MOSFET
Option C:	MESFET
Option D:	MODFET
6.	Threshold voltage of n-channel MOSFET _____if body voltage drops below the source voltage
Option A:	Increase
Option B:	Decrease

Option C:	Becomes Zero
Option D:	Remains Constant
7.	What is the condition of MOSFET to operate under deep triode region?
Option A:	$V_{ds} << 2(V_{gs} - V_{th})$
Option B:	$V_{ds} >> 2(V_{gs} - V_{th})$
Option C:	$V_{ds} << (V_{gs} - V_{th})$
Option D:	$V_{ds} >> (V_{gs} - V_{th})$
8.	What is the Cascode stage of Amplifier?
Option A:	CS+CD
Option B:	CS+CG
Option C:	CD+CG
Option D:	CS+CS
9.	In Common Source Stage with Diode connected load, MOSFET used as load operate in:
Option A:	Saturation Region
Option B:	Linear Region
Option C:	Deep Triode Region
Option D:	Cut off region
10.	In 2-stage Op-amp topology, each stage provides-
Option A:	High gain, High impedance
Option B:	High gain, High swing
Option C:	High impedance, High gain
Option D:	Low impedance, High swing
11.	What is CMRR?
Option A:	A_c/A_d
Option B:	A_d/A_c
Option C:	A_d
Option D:	A_c
12.	The most important advantage of differential signaling over single ended signaling is _____
Option A:	Reduction in noise
Option B:	Increase in Gain
Option C:	Reduction in Gain
Option D:	Increase in Slew Rate
13.	In which design all circuitry and all interconnections are designed?
Option A:	gate array design
Option B:	semi-custom design
Option C:	full custom design
Option D:	transistor design
14.	Select the option which is not correct about DLL over PLL.
Option A:	DLLs are more susceptible to noise.
Option B:	DLLs are more stable.

Option C:	DLLs don't have settling issues.
Option D:	DLLs are less susceptible to noise
15.	Give the Combination of basic blocks of PLL
Option A:	VCO, LPF, PD
Option B:	LPF, VCO, PD
Option C:	LPF, PD, VCO
Option D:	PD, LPF, VCO
16.	The primary advantage of switched capacitor circuit is_____
Option A:	Non Compatibility with CMOS technology
Option B:	Good accuracy of time constants
Option C:	Less voltage linearity
Option D:	Less switching capacity
17.	What is PTAT
Option A:	Proportional to absolute Temperature
Option B:	Proportional to different Temperature
Option C:	Proportional to complete Temperature
Option D:	Phase to absolute Temperature
18.	Consider a 3-bit DAC with $V_{ref} = 5$ V, then the value of LSB is given by
Option A:	1.66V
Option B:	0.625V
Option C:	1.66V
Option D:	0.625V
19.	A circuit which is used as a sampling gate in data converters
Option A:	Sample Circuit
Option B:	Hold Circuit
Option C:	Sample and Hold Circuit
Option D:	Schmitt Trigger
20.	The fastest Analog to Digital Converter (ADC) is_____
Option A:	Single slope type ADC
Option B:	Dual slope integrator type ADC
Option C:	Successive approximation ADC
Option D:	Counter type ADC

Subjective/Descriptive questions

Q2 (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	Analyze a NMOS current mirror circuit with suitable diagram with current equation?
B	Derive Av for common source amplifier with source degeneration and state it's advantages?
C	Explain working of Charge pump PLL and list out its applications?

Q3 (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	Explain sample and hold circuit with neat waveforms?
B	Explain gain boosting techniques of operational amplifiers?
C	Explain basic differential amplifier circuit with different modes of operations and it's characteristics with neat graph and expressions

University of Mumbai
Examination June 2021
Examinations Commencing from 1st June 2021
Program: **Electronics Engineering** (CBSGS)
Curriculum Scheme: Rev2012
Examination: BE Semester VIII Elective
Course Code: EXC8042 and Course Name: Mobile Communication

Time: 2 hour   Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	A spectrum of 30 MHz is allocated to a cellular system which uses two 25 KHz simplex channels to provide full duplex voice channels. What is the number of channels available per cell for 4 cell reuse factor?
Option A:	150 channels
Option B:	600 channels
Option C:	50 channels
Option D:	85 channels
2.	Which type of antenna is used for center excited cells?
Option A:	Dipole antenna
Option B:	Grid antenna
Option C:	Sectored antenna
Option D:	Omnidirectional antenna
3.	CDMA is advantageous over other Spread Spectrum techniques for
Option A:	Does not provide the privacy due to unique codes
Option B:	It accepts narrow band interference
Option C:	It will not use frequency reuse
Option D:	Resistance to multi path fading
4.	What is the spacing between each carrier frequency to avoid interference and crosstalk?
Option A:	100KHz
Option B:	200KHz
Option C:	128KHz
Option D:	256KHz
5.	The GSM cellular radio system uses GMSK in a 200-kHz, with a channel data rate of 270.833 kbps. Calculate the frequency shift between mark and space in kHz?
Option A:	135.4165
Option B:	115.4165
Option C:	153.6514
Option D:	513.1654
6.	The signal quality of the calls is constantly monitored by the base station, when the quality of the calls drops below a certain specified level. The base request the MTSO to try and find a better cell site.

Option A:	Hand-off
Option B:	Frequency reuse
Option C:	Cell splitting
Option D:	Roaming
7.	It is the process in which the same set of frequencies can be allocated to more than one cell, provided that the cells are separated by a sufficient distance
Option A:	Frequency reuse
Option B:	Frequency selection
Option C:	Handoff
Option D:	Sectoring
8.	IS-136, IS-95 and iDEN belong to
Option A:	1G
Option B:	3G
Option C:	2G
Option D:	4G
9.	Which of the following the first 3G CDMA air interface?
Option A:	IS-95
Option B:	IS-95B
Option C:	CDMA2000 1xRTT
Option D:	CDMAOne
10.	How much time it takes for handoff in digital cellular systems like GSM?
Option A:	1 second
Option B:	10 seconds
Option C:	1 minute
Option D:	10 milliseconds
11.	Which of the following is not a characteristic of 3G network?
Option A:	Communication over VoIP
Option B:	Unparalleled network capacity
Option C:	Multi-megabit Internet access
Option D:	LTE based network
12.	For a cellular system, if there are N cells and each cell is allocated k channel. What is the total number of available radio channels, S?
Option A:	S=k*N
Option B:	S=k/N
Option C:	S=N/k
Option D:	S=k*K
13.	The minimum spectrum allocation required for W-CDMA is
Option A:	5MHz
Option B:	2MHz
Option C:	500KHz
Option D:	100KHz

14.	What is the spacing between each carrier frequency to avoid interference and crosstalk?
Option A:	100KHz
Option B:	200KHz
Option C:	128KHz
Option D:	256KHz
15.	The wide band usage in CDMA helps in
Option A:	Increased immunity to interference
Option B:	Decrease immunity to jamming
Option C:	Single user access
Option D:	Different spectrum allocation in different time slots
16.	Mobile cellular transmitter have a maximum output power of
Option A:	1 mW
Option B:	20W
Option C:	10 W
Option D:	3W
17.	IS-95 system uses direct sequence spread spectrum with a chipping rate of
Option A:	1.23 MHz
Option B:	300KHz
Option C:	200 kHz
Option D:	400KHz
18.	What is an Erlang?
Option A:	It is a unit of magnetic field intensity measured around a conductor
Option B:	It is a unit of electro -magnetic field intensity measured around a conductor
Option C:	It is the number of erroneous bits received per unit of time
Option D:	It is equal to the number of simultaneous calls originated during a specific hourly period.
19.	What is the total number of Carrier Frequencies that can be formed in a 25MHz band width of either Uplink or Downlink of GSM?
Option A:	128
Option B:	126
Option C:	124
Option D:	123
20.	Which of the following has no backward compatibility with 3G Cdma2000?
Option A:	IS-95
Option B:	GPRS
Option C:	IS-95A
Option D:	IS-95B

Q2.	
A	**Solve any Two** **5 marks each**
i.	Explain speech coding in GSM
ii.	Differentiate between CDMA, TDMA and FDMA
iii.	Explain Grade of service in mobile communication

B	Solve any One	10 marks each
i.	What is frequency reuse? How does it influence the co channel interference	
ii.	Explain UMTS technology with the help of neat block diagram	

Q3.		
A	Solve any Two	5 marks each
i.	Interfaces used in GSM system	
ii.	Explain Erlang B and Erlang C systems	
iii.	Write short note on Wireless Sensor Network	
B	Solve any One	10 marks each
i.	Explain 4G LTE architecture with a neat block diagram	
ii.	With a neat block diagram explain forward traffic channel processing in CDMA	

University of Mumbai
Examination June 2021
Examinations Commencing from 1ˢᵗ June 2021
Program: BE Electronics Engineering
Curriculum Scheme: Rev2012
Examination: BE   Semester VIII
Course Code: EXC803   Course Name: MEMS Technology
Time: 2 hour   Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Most popular automotive MEMS device is
Option A:	DMD
Option B:	Airbag sensor
Option C:	Tunable lasers
Option D:	Pressure sensor
2.	In a differential Piezoresistive pressure sensor, the stress is linearly proportional to the
Option A:	Applied pressure
Option B:	Applied force
Option C:	Applied stress differential
O ption D:	Applied pressure differential
3.	The phenomenon by which an electrical resistance changes in response to mechanical stress is called as
Option A:	Piezoresistivity
Option B:	Piezoelectricity
Option C:	Thermoelectricity
Option D:	Thermal conductivity
4.	Which material is used in MEMS photonic devices?
Option A:	Silicon dioxide
Option B:	Silicon carbide
Option C:	Gallium arsenide
Option D:	Silicon nitride
5.	The ratio of lateral strain to linear strain is called as
Option A:	Modulus of Elasticity
Option B:	Modulus of Rigidity
Option C:	Bulk Modulus
Option D:	Poisson's Ratio
6.	Miller indices for Octahedral plane in cubic crystal
Option A:	(100)
Option B:	(101)
Option C:	(111)
Option D:	(110)

7.	Single silicon crystals are basically of --- structure.
Option A:	Body-Centered Cubic
Option B:	Face-Cubic-Center
Option C:	Hexagonal Close Packed
Option D:	None of the Mentioned
8.	The electrical resistance of silicon piezoresistors varies in
Option A:	All directions
Option B:	Only in preferred direction
Option C:	Only in horizontal direction
Option D:	Only in vertical direction
9.	Electroplating technique is suitable for
Option A:	Making conduction film ceramic
Option B:	Coating with considerable thickness
Option C:	Coating without electric current
Option D:	Making conduction film of gold or copper
10.	Micromachining fabrication process starts with
Option A:	Silicon wafer
Option B:	Photo lithography
Option C:	Wet etching
Option D:	Dry etching
11.	In Crzochralski crystal process, the materials are heated up to (in ^{0}C)
Option A:	970
Option B:	050
Option C:	1420
Option D:	1290
12.	Application of PECVD includes
Option A:	High temperature insulating process
Option B:	Low temperature high deposition process
Option C:	High temperature and low deposition process
Option D:	High temperature high deposition process
13.	Advantage of LPCVD is
Option A:	Low pressure large wafer capacity
Option B:	High temperature
Option C:	Slow deposition
Option D:	Moderate pressure deposition
14.	Ion implementation technique is used to
Option A:	Deposit an insulating layer on an insulator
Option B:	Deposit an insulation layer on semiconductor
Option C:	Deposit a metallic layer on semiconductor
Option D:	Dope a semiconductor
15.	In HP Thermal inject printer, a well under an orifice contains a small volume of

	ink held in place by
Option A:	Adhesion
Option B:	Surface tension
Option C:	Anodic Bonding
Option D:	Insulating layer
16.	The OFF state of the memory cell tilts the DMD mirror which of the following angle? (In Degrees)
Option A:	-10
Option B:	+10
Option C:	-5
Option D:	+5
17.	The basic structure of a piezoresistive pressure sensor consists of four sense elements in a
Option A:	Wien Bridge
Option B:	Maxwell Bridge
Option C:	Wheatstone bridge
Option D:	Kelvin Bridge
18.	The device fabricated underneath the micromirror array controls the individual actuation states of each pixel and their duration is
Option A:	Yoke
Option B:	Hinge
Option C:	Mirror post
Option D:	SRAM
19.	What is a temperature coefficient of resistance (TCR)?
Option A:	The rate of increase in voltage as a function of temperature
Option B:	The rate of increase in resistance as a function of temperature
Option C:	The rate of increase in pressure as a function of temperature
Option D:	The rate of increase in current as a function of temperature
20.	The plot of a failure rate vs. time (i.e., failure frequency distribution) curve is called as
Option A:	Bathtub curve
Option B:	Histogram
Option C:	Normalized histogram
Option D:	Distribution function

Q2	
A	**Solve any Two** **5 marks each**
i.	Explain role of MEMS sensors in Bio-Medical applications.
ii.	Explain Young modulus and Poisson's ratio.
iii.	Explain DRIE method in detail.
B	**Solve any One** **10 marks each**
i.	List different Silicon compounds. Explain their characteristics and applications in MEMS device fabrication.

ii.	Explain the importance and various etch stop techniques.

Q3		
A	**Solve any Two**	**5 marks each**
i.	Explain wafer bonding and its techniques.	
ii.	Write a note on ink firing sequence in HP thermal ink jet printer head.	
iii.	Write a note on reliability of MEMS devices.	
B	**Solve any One**	**10 marks each**
i.	With neat schematic explain PECVD technique.	
ii.	List the types of pressure sensor and explain the process steps for fabricating the piezoresistive pressure sensor with neat diagrams.	