Program: BE - ELECTRONICS Engineering

Curriculum Scheme: Revised - 2012
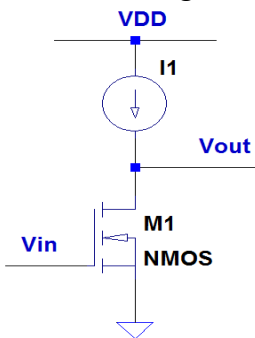
Examination: Fourth Year Semester - VIII

Course Code: EXC801 and Course Name: CMOS VLSI DESIGN

Time: 1 hour   Max. Marks: 50

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Note to the students :- All the Questions are compulsory and carry equal marks .

Q1.	Which of the following statement is true in case of Base to Emitter voltage (VBE) of BJT?
Option A:	It has negative temperature coefficient
Option B:	It has positive temperature coefficient
Option C:	It's value is constant
Option D:	It is equal to (IB)2
Q2.	What is true for an analog design?
Option A:	Simple to design
Option B:	Cost effective design
Option C:	Two-dimensional trade-off design
Option D:	Multi-dimensional trade-off design
Q3.	In deep triode region, the MOSFET operates as a_____
Option A:	resistor controlled by the overdrive voltage
Option B:	resistor controlled by the bulk voltage
Option C:	resistor controlled by the drain voltage
Option D:	resistor independent of the overdrive voltage
Q4.	In a simple current mirror Iout ≠ Iref. This is mainly due to_____
Option A:	Body effect
Option B:	Channel length Modulation
Option C:	Velocity saturation
Option D:	Subthreshold conduction
Q5.	For the circuit given below the voltage gain is equal to

Option A:	$g_{\mathrm{m}}.R_{\mathrm{D}}$
Option B:	$g_{\mathrm{m}}.(R_{\mathrm{D}}\,||\,r_o)$
Option C:	$g_{\mathrm{m}}.\,r_o$
Option D:	Infinity
Q6.	Analog Design Octagon represents trade-offs between various parameters to design-
Option A:	high performance amplifier
Option B:	voltage source
Option C:	current source
Option D:	transducer
Q7.	In an amplifier with diode connected load the NMOS load transistor is always in
Option A:	Saturation region
Option B:	Triode region
Option C:	Deep triode region
Option D:	Cut off region
Q8.	If the gain Av in the diode connected load of CS stage is required to be 10, what should be the ratio of (W/L) of NMOS and PMOS devices in the circuit? Assume μn = 2μp and neglect channel length modulation.
Option A:	$\left(\dfrac{W}{L}\right)p = 50\left(\dfrac{W}{L}\right)n$
Option B:	$\left(\dfrac{W}{L}\right)n = 50\left(\dfrac{W}{L}\right)p$
Option C:	$\left(\dfrac{W}{L}\right)n = 10\left(\dfrac{W}{L}\right)p$
Option D:	$\left(\dfrac{W}{L}\right)p = 10\left(\dfrac{W}{L}\right)n$
Q9.	The significant source of MOSFET noise is
Option A:	Channel region
Option B:	Source region
Option C:	Substrate region
Option D:	Gate region
Q10.	When a differential amplifier is operated single-ended_____
Option A:	The output is grounded
Option B:	One input is grounded and signal is applied to the other
Option C:	Both inputs are connected to together
Option D:	The output is not inverted
Q11.	The Differential output of the difference amplifier is the amplification of_____
Option A:	Difference between the voltages of input signals
Option B:	Difference between the output of each transistor

Option C:	Difference between the supply and the output of each transistor
Option D:	Difference between the voltage of output signals
Q12.	Common mode response of differential pair depends on _____ and asymmetries in the circuit.
Option A:	the output capacitance of voltage source
Option B:	the input impedance of voltage source
Option C:	the input impedance of tail current source
Option D:	the output impedance of tail current source
Q13.	One of the advantages of differential signaling is
Option A:	Low immunity to environmental noise
Option B:	Low output voltage swing
Option C:	High rejection of supply noise
Option D:	Non-linearity and mismatch
Q14.	Which of the following is an application of Gilbert cell?
Option A:	Analog current multiplier
Option B:	Analog voltage multiplier
Option C:	Analog voltage subtractor
Option D:	Analog current subtractor
Q15.	For the perfect lock, the VCO output should be_____
Option A:	900
Option B:	450
Option C:	600
Option D:	300
Q16.	Which among the following serves as an input stage to most of the op-amps due to its compatibility with IC technology?
Option A:	Differential amplifier
Option B:	Cascode amplifier
Option C:	Operational transconductance amplifiers (OTAs)
Option D:	Voltage operational amplifier
Q17.	Op-amp is 'high-gain amplifier' whose value is in the range of _____
Option A:	1 to 10
Option B:	1 to 200
Option C:	101 to 105
Option D:	105 to 109
Q18.	Folded cascade op amp topology has which of the following advantages over telescopic topology ?
Option A:	Higher voltage gain
Option B:	Lower power dissipation
Option C:	Slightly higher voltage swing

Option D:	Higher pole frequencies
Q19.	Non linearity error due to charge injection in MOS sampling circuits is due to _____
Option A:	Channel length modulation effect
Option B:	Subthreshold conduction in MOS switch
Option C:	Body bias effect causing variation in MOS threshold voltage
Option D:	Constant threshold voltage of MOS switch
Q20.	The Logic gate that works similar to phase detector is:
Option A:	AND gate
Option B:	OR gate
Option C:	XOR gate
Option D:	NOT gate
Q21.	Which among the following has better capture tracking & locking characteristics?
Option A:	XOR phase detector
Option B:	Edge triggered phase detector
Option C:	Analog phase detector
Option D:	XOR Gate
Q22.	The maximum output level achieved by NMOS sampler with Vdd gate voltage
Option A:	Vdd
Option B:	Vdd-Vth
Option C:	Vdd+Vth
Option D:	Vth
Q23.	A single common-source stage does not oscillate because _____
Option A:	The maximum total phase shift is 2700
Option B:	The maximum total phase shift is 1800
Option C:	There is no dependence on phase shift
Option D:	There is zero phase shift
Q24.	The importance of Hardware software co-design system is _____
Option A:	Improve design quality, design cycle time and cost
Option B:	Simplifying design
Option C:	Remove noise
Option D:	Improve gain of amplifier devices
Q25.	The sensitive sections of the circuits fabricated on lightly doped substrates can be isolated and prevented from substrate noise by
Option A:	Reducing parasitic coupling
Option B:	Shielding
Option C:	Proper floor planning
Option D:	Guard rings

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code:EXC802   and   Course Name: Advanced Networking Technologies

Time: 1 hour   Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Bluetooth transceiver devices operate in _____ band.
Option A:	2.4 GHz ISM
Option B:	2.5 GHz ISM
Option C:	2.6 GHz ISM
Option D:	2.7 GHz ISM
Q2.	What is one of the features that make Bluetooth different from other wireless technologies?
Option A:	long-distance wireless capabilities
Option B:	inability to transfer voice and data between battery-operated mobile devices
Option C:	low power consumption
Option D:	high bandwidth wireless capabilities
Q3.	Bluetooth supports _____
Option A:	point-to-point connections
Option B:	point-to-multipoint connection
Option C:	both point-to-point connections and point-to-multipoint connection
Option D:	multipoint to point connection
Q4.	A wireless PAN will not link to which of the following?
Option A:	nearby laptop
Option B:	PC across a room
Option C:	PC in an adjacent room
Option D:	nearby PDA
Q5.	What is one advantage of setting up a DMZ with two firewalls?
Option A:	You can control where traffic goes in three networks
Option B:	You can do stateful packet filtering
Option C:	You can do load balancing
Option D:	Improved network performance

Q6.	Packet filtering firewalls are deployed on _____
Option A:	routers
Option B:	switches
Option C:	hubs
Option D:	repeaters
Q7.	Which of the following is NOT true about Bluetooth?
Option A:	Bluetooth is low bandwidth wireless technology.
Option B:	Bluetooth has a bandwidth of 720 kbps.
Option C:	Bluetooth is a long-distance wireless technology.
Option D:	Bluetooth has a range of about 30 feet.
Q8.	VPN is abbreviated as _____
Option A:	Visual Private Network
Option B:	Virtual Protocol Network
Option C:	Virtual Private Network
Option D:	Virtual Protocol Networking
Q9.	Responsible Layer For the movement of a signal from its optical source to optical destination
Option A:	Photonic
Option B:	Path
Option C:	Section
Option D:	Line
Q10.	---- is a partial payload that can be inserted into an STS-l and combined with other partial payloads to fill out the frame.
Option A:	Signal
Option B:	SPE
Option C:	Virtual Tributaries
Option D:	Payload
Q11.	This system can be extremely difficult to troubleshoot , manage and provision.
Option A:	DS2
Option B:	ISDN
Option C:	DWDM
Option D:	DS1
Q12.	This overhead supports function of performance monitoring , automatic protection switching, Locating SPE.

Option A:	Section overhead
Option B:	Line overhead
Option C:	Path overhead
Option D:	SONET Frame
Q13.	Asynchronous Transfer Mode (ATM) uses which type of multiplexing
Option A:	Synchronous TDM
Option B:	Asynchronous TDM
Option C:	FDM
Option D:	WDM
Q14.	In AAL5, we may need upto ____ bytes of padding
Option A:	0 (no padding)
Option B:	40
Option C:	43
Option D:	47
Q15.	An ATM cell size is of _____ bytes
Option A:	45 bytes
Option B:	47 bytes
Option C:	48 bytes
Option D:	53 bytes
Q16.	Virtual circuit identifier (VCI) in frame relay is called _____
Option A:	Data link connection identifier
Option B:	Frame relay identifier
Option C:	Cell relay identifier
Option D:	Circuit connection identifier
Q17.	Access Layer Design not involve following key area:
Option A:	Physical Connectivity
Option B:	Protocols
Option C:	Switching versus Routing
Option D:	Security
Q18.	_____ cable consists of an inner copper core and a second conducting outer sheath.
Option A:	Twisted-pair
Option B:	Shielded twisted-pair
Option C:	Coaxial cable
Option D:	Fiber optic
Q19.	Which layer 1 device can be used to enlarge the area covered by a single LAN segment?

Option A:	Switch
Option B:	NIC
Option C:	Hub
Option D:	RJ45 transceiver
Q20.	Which of the following is not a guided medium?
Option A:	fiber-optic cable
Option B:	coaxial cable
Option C:	twisted-pair cable
Option D:	atmosphere
Q21.	The major drawback of _____ is the additional cost of equipment & servers to localize the traffic.
Option A:	Ubiquitous access
Option B:	Hierarchical Access
Option C:	Local access
Option D:	Global access
Q22.	The DoS attack, in which the attacker establishes a large number of half-open or fully open TCP connections at the target host is _____
Option A:	Vulnerability attack
Option B:	Bandwidth flooding
Option C:	Connection flooding
Option D:	UDP flooding
Q23.	----------- is a malicious act that aims to corrupt or steal data or disrupt an organization's systems or the entire organization
Option A:	Security threats
Option B:	Security hazard
Option C:	Virus
Option D:	Malware
Q24.	It's an intermediary server separating end users from the websites they browse
Option A:	Firewall
Option B:	Proxy
Option C:	Web server
Option D:	File server
Q25.	Message _____ means that the receiver is ensured that the message is coming from the intended sender, not an imposter.
Option A:	confidentiality

Option B:	integrity
Option C:	authentication
Option D:	Access Control

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code: EXC 803and Course Name: MEMS Technology

Time: 1 hour   Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	One of the following properties is an advantage of MEMS technology :
Option A:	Miniaturization with lots of functionality
Option B:	High power
Option C:	Fast actuation techniques
Option D:	Low in sensitivity
Q2.	Which one is medical application of MEMS technology
Option A:	drug delivery system
Option B:	air bag sensor
Option C:	micro relay
Option D:	optical switch
Q3.	Change in output of any sensor with respect to change in input is expressed as
Option A:	Specificity
Option B:	Sensitivity
Option C:	Threshold limit
Option D:	Gauge Factor
Q4.	Accelerometer, gyroscope and e-compass are some of the commonly used MEMS sensors in
Option A:	medical device
Option B:	temperature sensor device
Option C:	bionic body parts
Option D:	Aircraft
Q5.	Which of the following factors affect the mechanical properties of a material under applied loads?
Option A:	Content of alloys
Option B:	Grain size
Option C:	Imperfection and defects
Option D:	Shape of material
Q6.	Silicon dioxide used as _____ in surface micromachining

Option A:	sacrificial layer
Option B:	Mask
Option C:	intermediate layer
Option D:	Insulator
Q7.	Select brittle and fragile material
Option A:	Silicon dioxide
Option B:	Gallium Arsenide
Option C:	Silicon
Option D:	Silicon Nitride
Q8.	What is typical value Silicon Yong's Modulus
Option A:	415 GPa
Option B:	190 GPa
Option C:	230 GPa
Option D:	10 GPa
Q9.	In MEMS , from the following list select the common substrate material
Option A:	Gallium Arsenide
Option B:	Carbon
Option C:	silicon dioxide
Option D:	Nickel
Q10.	In MEMS , from the following list select the common substrate material
Option A:	Gallium Arsenide
Option B:	carbon
Option C:	silicon dioxide
Option D:	Nickel
Q11.	Wet oxidation of silicon is often preferred because of
Option A:	Better quality of SiO2
Option B:	Faster oxidation
Option C:	Lower cost
Option D:	Easy of operation
Q12.	Sputtering is processed at --------------- temperature.
Option A:	Low
Option B:	Elevated
Option C:	High
Option D:	Very High
Q13.	Which of the following BEST describes the photolithography process?
Option A:	The process step that transfers a pattern into an underlying layer or the substrate's bulk.
Option B:	The process step that defines and transfers a pattern into a resist layer on the wafer.
Option C:	The process step that deposits a resist layer on the surface of the wafer.

Option D:	The process step that aligns the various layers of a microsystem device to each other.
Q14.	What is the chemical used in surface conditioning?
Option A:	HMDS (Hexa methyl dixalizane)
Option B:	KOH (potassium hydroxide)
Option C:	Piranha (sulfuric acid and hydrogen peroxide)
Option D:	PMMA (poly methyl methacrylate)
Q15.	When selecting materials for masks in deep etching process, one would select materials with
Option A:	High selectivity ration
Option B:	Low selectivity ration
Option C:	Medium selectivity ration
Option D:	Any value of selectivity ration
Q16.	Bulk manufacturing involves primarily -------------- portions of material from the substrate
Option A:	Adding
Option B:	Keeping the same
Option C:	Both adding and subtracting
Option D:	Subtracting
Q17.	The most popular structural material in surface micromachining is
Option A:	PSG
Option B:	Polysilicon
Option C:	Silicon dioxide
Option D:	silicon nitride
Q18.	The Most expensive micromanufacturing technique is
Option A:	Bulk manufacturing
Option B:	Surface micromachining
Option C:	The LIGA process
Option D:	Polymer Micro/Nano Fabrication
Q19.	Selectivity ratio of KOH for silicon dioxide is
Option A:	10^3
Option B:	10^4
Option C:	10^2
Option D:	10^5
Q20.	In the application of blood pressure measurement which MEMS sensor is used
Option A:	Accelerometer
Option B:	Microheater
Option C:	Cantilever
Option D:	Pressure sensor

Q21.	Accelerometer is used in
Option A:	Pacemaker
Option B:	Explosive detection
Option C:	Bacteria detection
Option D	DMA amplification
Q22.	For explosive detection which MEMS sensor is used
Option A:	Cantilever
Option B:	Pressure Sensor
Option C:	DMD
Option D:	Accelerometer
Q23.	Piezoelectric sensing technique is used in which of the following MEMS device
Option A:	Accelerometer
Option B:	Micro heater
Option C:	Digital micro mirror device
Option D:	Ink jet print head
Q24.	MEMS device characterization is process of determining .
Option A:	Characteristics of MEMS devices
Option B:	Fabrication methods.
Option C:	Failure of MEMS devices
Option D:	Determination of cost of MEMS devices.
Q25.	Following curve is used to describe reliability of MEMS devices.
Option A:	Parabola
Option B:	Hyperbola
Option C:	Ellipse
Option D:	Bath tub Curve

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code: EXC8041and Course Name: Robotics

Time: 1hour   Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Iterative method for solving Inverse Kinematic Problem is
Option A:	Numerical Method
Option B:	Vector method
Option C:	Graphical Method
Option D:	Analytical Method
Q2.	Differential motion of a robot's hand frame D and the joint differential motion D_θ is related by
Option A:	$[D]=[D_\theta] + [J]$
Option B:	$[D] =[D_\theta] - [J]$
Option C:	$[D] =[J] *[D_\theta]$
Option D:	$[D]=[D_\theta]*[J]$
Q3.	One image processing technique used for segmenting the image is
Option A:	Template matching
Option B:	Region Labeling and Region Growing
Option C:	Moments
Option D:	Iterative processing
Q4.	Bug algorithm generally follows
Option A:	Fine motion
Option B:	High velocity
Option C:	Follow obstacle boundary
Option D:	Minimum path
Q5.	$TCV = \begin{bmatrix} w^1 \\ w^2 \end{bmatrix}$ what is w^2
Option A:	Scaled Approach vector
Option B:	Scaled Sliding vector
Option C:	Scaled Normal Vector
Option D:	Yaw

Q6.	Differential motions can be used to
Option A:	Derive velocity relationship between different parts of the robot
Option B:	Derive Force relationship between different parts of the robot
Option C:	Derive acceleration and position of the robot
Option D:	Derive speed and distance travelled by the robot
Q7.	Moments of images are useful in
Option A:	Line descriptor
Option B:	Area descriptors
Option C:	Object detection
Option D:	Iterative processing
Q8.	Point[1 2 1]' is translated along X and Z axis by 3 and -2 units What is the new position
Option A:	[1 2 3]
Option B:	[4 2 -1]
Option C:	[5 2 3]
Option D:	[1 2 1]
Q9.	Find the cubic polynomial equation for position if the first joint of a 6 axis robot if C_0 =30, C_1=0, C_2=5.4 and C_3=-0.72.
Option A:	$\Theta(t) = 30+ 5.4t^2 - 0.72t^3$
Option B:	$\Theta(t) = 5.4 +2.16 t^2 + t^3$
Option C:	$\Theta(t) = 10.8 -2.16 t + t^2$
Option D:	$\Theta(t) = 10.8 t-2.16 t$
Q10.	In robot motion planning, attractive potential describe
Option A:	Obstacle avoidance
Option B:	Circumnavigation
Option C:	Object detection
Option D:	Move to the goal
Q11.	First three elements of TCV are
Option A:	Orientation
Option B:	Position
Option C:	Amplitude
Option D:	Direction
Q12.	In bug algorithm m lie connects
Option A:	q start to q goal
Option B:	Boundary ogf obstacle
Option C:	Obstacle
Option D:	Line of obstacle
Q13.	Heavy Load lifting is done using---- drive

Option A:	Electric
Option B:	Hydraulic
Option C:	Pneumatic
Option D:	Servo
Q14.	Which is not a property of road map
Option A:	Accessibility
Option B:	Depart ability
Option C:	Connectivity
Option D:	Continuity
Q15.	Parabolic blends are used at two ends of a linear trajectory function
Option A:	As pure linear trajectory function generates linear movement of the end effector only
Option B:	To avoid infinite acceleration and deceleration at the beginning and at the end of linear motion
Option C:	To reduce manufacturing cost of the robots
Option D:	To reduce computational complexity of robots
Q16.	Screw matrix due to Joint parameters are about
Option A:	X axis
Option B:	Y axis
Option C:	Z axis
Option D:	Link axis
Q17.	For the linear and rotary robotic joints, our aim is to determine
Option A:	joint forces and torques, respectively
Option B:	Joint torques and forces, respectively
Option C:	Joint forces only
Option D:	Joint torques only
Q18.	In which of the following operations continuous path motion control is used
Option A:	Pick and Place
Option B:	Loading and Unloading
Option C:	Arc welding
Option D:	Spot welding
Q19.	Which of the following is a method for template matching
Option A:	Shrink Operator
Option B:	Swell Operator
Option C:	Sobel Operator
Option D:	Normalized Cross Correlation
Q20.	Yaw,Pitch and Roll are
Option A:	Major axis
Option B:	Minor axis

Option C:	Shoulder
Option D:	Elbow
Q21.	A transformation which transforms homogeneous coordinates of camera to homogeneous coordinates of image
Option A:	Euler number
Option B:	Perspective transformation
Option C:	Template matching
Option D:	Edge detection
Q22.	In brushfire algorithm the obstacles are numbered with
Option A:	0
Option B:	1
Option C:	2
Option D:	3
Q23.	Joint distances for two axis planar robot is
Option A:	5
Option B:	6
Option C:	0
Option D:	3
Q24.	To plan a trajectory in joint space which generates a straight line trajectory in tool configuration space we use
Option A:	Direct Kinematics
Option B:	Inverse Kinematics
Option C:	Velocity kinematics
Option D:	Tool kinematics
Q25.	Give the differential operator for the differential transformations dx=0.05,dy=0.03,dz=0.01 units and δx = 0.02,δy=0.04 and δz= 0.06 radians.
Option A:	$\begin{matrix} 1 & 0.02 & 0.05 & 0 \\ 0.02 & 0 & 0.1 & 0 \\ 0.05 & 0.1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{matrix}$
Option B:	$\begin{matrix} 1 & 0.06 & -0.04 & 0 \\ -0.02 & 1 & -0.05 & 0 \\ 0.05 & 0.01 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{matrix}$
Option C:	$\begin{matrix} 0 & -0.06 & 0.04 & 0.05 \\ 0.06 & 0 & -0.02 & 0.03 \\ -0.04 & 0.02 & 0 & 0.01 \\ 0 & 0 & 0 & 0 \end{matrix}$

Option D:	$\begin{matrix} 0.01 & 0.02 & -0.05 & 0 \\ 0.05 & -0.01 & 1 & 0 \\ 0 & 0 & 0.1 & 0 \\ 0 & 0 & 0 & 1 \end{matrix}$	

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code: EXC8042 and Course Name: Mobile Communication

Time: 1 hour   Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	Fading of the received radio signals in a mobile communication environment occurs because of _____
Option A:	Direct propagation
Option B:	Multipath Propagation
Option C:	Bi-path Propagation
Option D:	Random Propagation
Q2.	_____are typically characterized by very small cells, especially in densely populated areas.
Option A:	2G system
Option B:	3G system
Option C:	2.5G system
Option D:	3.5G system
Q3.	Garage door opener is a-
Option A:	Transmitter
Option B:	Receiver
Option C:	Transceiver
Option D:	Hotspot
Q4.	The modulation technique used for mobile communication systems during world war II was
Option A:	Amplitude modulation
Option B:	Frequency modulation
Option C:	Amplitude Shift Keying
Option D:	Frequency Shift Keying
Q5.	The design process of selecting and allocating channel groups for all the cellular basestations within a system is called
Option A:	Umbrella Approach
Option B:	Sectoring
Option C:	Splitting
Option D:	Frequency Reuse
Q6.	Which of the following memory device stores information such as subscriber's identification number in GSM?

Option A:	Register
Option B:	Flip flop
Option C:	SIM
Option D:	SMS
Q7.	GSM is an example of
Option A:	TDMA cellular systems
Option B:	FDMA cellular systems
Option C:	HDMA cellular systems
Option D:	SDMA cellular systems
Q8.	Which of the following is not a control channel of GSM?
Option A:	BCH
Option B:	CCCH
Option C:	DCCH
Option D:	TCH
Q9.	_____superframes are grouped to form one hyperframe
Option A:	2048
Option B:	2058
Option C:	1058
Option D:	58
Q10.	The uplink frequency range specified for GSM is-
Option A:	800-860MHz
Option B:	500-560MHz
Option C:	933 - 960 MHz
Option D:	550-660MHz
Q11.	CDMA IS-95 uses _____ type of Handoff.
Option A:	Break-before-make
Option B:	Make-before-break
Option C:	Mobile assisted hand-off
Option D:	Near-far
Q12.	In CDMA IS-95, signaling information from the base station to the mobile can be transmitted using------- or ----- methods.
Option A:	Blank and dim
Option B:	Blank and burst
Option C:	Dim and burst
Option D:	blank-and-burst, dim-and-burst
Q13.	A forward waveform transmitted by IS-95 CDMA base station can have upto ----------- paging channels.
Option A:	Seven
Option B:	Eight
Option C:	Nine
Option D:	Ten

Q14.	Using a combination of techniques, user data in IS-95 is spread to a channel chip rate of -----------
Option A:	1.1122 Mcps
Option B:	1.2288 Mcps
Option C:	1. 2244 Mcps
Option D:	1.0022 Mcps
Q15.	A forward and reverse channel pair is separated by ---------- for cellular band operation
Option A:	40 Mhz
Option B:	50 Mhz
Option C:	45 Mhz
Option D:	60 Mhz
Q16.	What is the term used by ITU for a set of global standards of 3G systems?
Option A:	IMT 2000
Option B:	GSM
Option C:	CDMA
Option D:	EDGE
Q17.	Which new modulation technique is used by EDGE?
Option A:	BPSK
Option B:	8- PSK
Option C:	QPSK
Option D:	FSK
Q18.	Which of the following leads to evolution of 3G networks in CDMA systems?
Option A:	IS-95
Option B:	IS-95B
Option C:	CdmaOne
Option D:	Cdma2000
Q19.	What is the name of the web browsing format language supported by 2.5G technology?
Option A:	Wireless Application Protocol
Option B:	Hypertext Markup Language
Option C:	Extensible Markup Language
Option D:	Hypertext Transfer Protocol
Q20.	Cdma2000 1xEV was developed by _____
Option A:	Motorola
Option B:	AT&T Laboratories
Option C:	Qualcomm
Option D:	NTT
Q21.	WiMax stands for-
Option A:	Wireless Interoperability for Machine Access

Option B:	Wireless Interoperability for Microwave Access
Option C:	Wired Interoperability for Machine Access
Option D:	Wired Interoperability for Microwave Access
Q22.	The type of Switching used by 4G technology is -
Option A:	Circuit switching technique.
Option B:	Virtual switching technique.
Option C:	Mixed switching technique.
Option D:	packet switching technique.
Q23.	Which of the following is a 3G Wireless Standard
Option A:	WCDMA
Option B:	GPRS
Option C:	EDGE
Option D:	LTE
Q24.	A wireless network without a centralized access point may be
Option A:	Infrastructure network
Option B:	Adhoc Network
Option C:	Bidirectional Network
Option D:	Unidirectional Network
Q25.	What is full form of WSN
Option A:	Wireless Smart Network
Option B:	Wireless Sensor Network
Option C:	Wired Smart Network
Option D:	Wireless Sequential Network

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2012

Examination: Fourth Year Semester VIII

Course Code: EXC8043 and Course Name: Digital Control system
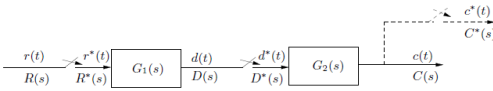
Time: 1 hour												Max. Marks: 50

Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	In a first order hold frequency response, the magnitude of |G(jw)|/T at half the sampling frequency is given by
Option A:	1.336
Option B:	0
Option C:	1
Option D:	0.636
Q2.	_____process in continuous domain can be approximated using Rectangular and Trapezoidal numerical integration.
Option A:	Differentiation
Option B:	Integration
Option C:	Summation
Option D:	Division
Q3.	Differentiation in continuous domain can be approximated using _____difference approximations.
Option A:	Backward
Option B:	Forward
Option C:	Backward or Forward
Option D:	None
Q4.	Digital Control is more flexible than analog control technique as
Option A:	It consists of digital circuits
Option B:	It is a computer program that can be easily modified
Option C:	It has flexible components
Option D:	None

Q5.	To implement Digital Control Algorithm, which of the following can be used?
Option A:	Microprocessor
Option B:	Microcontroller
Option C:	PC
Option D:	All of the above
Q6.	If the highest frequency component in the signal is wc rad/sec, then it is completely characterized by values of signal measured at instants of time separated by
Option A:	T=2π/Wc
Option B:	T=π/wc
Option C:	T=wc/π
Option D:	T=2wc/π
Q7.	For a system shown by block diagram as follows, the overall transfer function is
Option A:	$G_{1(z)}/G_{2(z)}$
Option B:	$G_{1(z)} \times G_{2(z)}$
Option C:	$G_{1(z)} + G_{2(z)}$
Option D:	$G_{1(z)} - G_{2(z)}$
Q8.	Z transform for a discretized unit ramp input is given by
Option A:	$\dfrac{Tz}{(z+1)^2}$.
Option B:	$\dfrac{T}{(z-1)^2}$.
Option C:	$\dfrac{z}{(z-1)^2}$.

Option D:	$\dfrac{Tz}{(z-1)^2}$
Q9.	Pulse transfer function or _____ characterizes the discrete data system responses only at _____.
Option A:	Z transfer function, Sampling Instants
Option B:	S transfer function, Sampling Instants
Option C:	Transfer Function, sampling Instants
Option D:	Transfer Function, Sampling frequency
Q10.	In discretization process of stable analog system using bilinear transform method, the resultant discrete time system will have stable poles located in a circle centred at _____having a radius of_____.
Option A:	(1,0) , 1/2
Option B:	(1/2, 0), ½
Option C:	(0,0), 1
Option D:	(1/2,0), 1
Q11.	Which of the following analog to digital transformation method results in frequency warping?
Option A:	Impulse Invariance
Option B:	Bilinear Transformation
Option C:	Finite Difference Approximation
Option D:	Step Invariance
Q12.	For the system given in block diagram write down expression for velocity error constant Kp

Option A:	$$Kv = \lim_{z \to 1}(1 - z^{-1})GH(z)/T$$
Option B:	$$Kv = \lim_{z \to 1} H(z) /GH(z)$$
Option C:	$$Kv = \lim_{z \to 0} GH(z) /T$$
Option D:	$$Kv = \lim_{z \to 0} GH(z) T$$

Q13.	Closed Loop Poles are roots of characteristic equation P(z), which is given as
Option A:	$$1 + GH(z) = 0$$
Option B:	$$1 - GH(z) = 0$$
Option C:	$$\frac{1}{GH(z)} =$$
Option D:	$$GH(z) = 0$$

Q14.	In Jury's stability test, singular case occurs when
Option A:	Some elements of a row are zeros
Option B:	All elements of a row are zeros
Option C:	Any of the above
Option D:	None of the above

Q15.	For a transfer function G(z) given by $$G(z) = \frac{0.5z}{(z - 1)(z - 0.5)}$$ Position error constant and steady state error is given by
Option A:	Kp=∞, ess=0
Option B:	Kp=0, ess=∞
Option C:	Kp=∞,ess=
Option D:	Kp=0, ess=0

Q16.	For a discrete time system having a single input is described by 3 difference equations, what is the order of system matrix B, in the following equation? $$x(k + 1) = Ax(k) + Bu(k)$$ $$y(k) = Cx(k)$$
Option A:	2×3
Option B:	2×2

Option C:	3×1
Option D:	. 3×2
Q17.	For a system having 6 poles in the transfer function, the number of state variables is
Option A:	3
Option B:	6
Option C:	4
Option D:	. 2
Q18.	For a given discrete state variable model $$x(k + 1) = Ax(k) + Bu(k)$$ $$y(k) = Cx(k)$$ Roots of the equation, Det(zI-A)=0, gives
Option A:	Eigenvalues of A
Option B:	EigenVectors of A
Option C:	Eigenvalues of B
Option D:	EigenVectors of B
Q19.	What is the order of the system described by $$x(k + 1) = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x(k) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(k)$$
Option A:	Three
Option B:	Two
Option C:	One
Option D:	Zero
Q20.	The control law using state feedback, given by expression u(k)= -Kx(k)+br(k), u(k)is controller output, K is controller gain, x(k)-state vector, r(k), reference input gives
Option A:	Tracking Control
Option B:	Regulatory Control
Option C:	PI Control

Option D:	.PID Control
Q21.	In pole placement control, all the poles of CL system are placed
Option A:	Inside Unit Circle
Option B:	Outside Unit Circle
Option C:	On Unit Circle
Option D:	At origin of z plane
Q22.	For a discrete time 5th order system, if an observer estimates 5 state variables, then it is a
Option A:	Reduced Order Observer
Option B:	Full Order Observer
Option C:	Multi-dimensional observe
Option D:	Full Controller
Q23.	Control systems become unstable internally due to _____cancellations in the transfer function of the system.
Option A:	Pole-Pole
Option B:	Pole-Zero
Option C:	Zero-Zero
Option D:	None
Q24.	Which of the following represents PI controller?
Option A:	U(k)=K1e(k)
Option B:	U(k)=K1e(k)+ K2(e(k)-e(k-1))/T
Option C:	U(k)=K1e(k)+$K2\sum_{k-1}^{k}e(k)$
Option D:	U(k)=K1e(k)+$K2\sum_{k-1}^{k}e(k)$+ K2(e(k)-e(k-1))/T
Q25.	Which of the following controller completely removes steady state error from the output of a system?
Option A:	PI controller
Option B:	P Controller
Option C:	PD Controller
Option D:	Pole Placement Controller

University of Mumbai
Examination 2020 under Cluster 06
(Lead College: Vidyavardhini's College of Engg. Tech.)
Examinations Commencing from 23rd December 2020 to 6th January 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev. 2012
Examination: BE Semester VIII
Course Code: EXC801   Course Name: CMOS VLSI Design
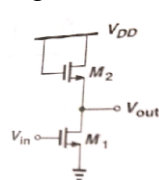
Time: 2 hours   Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	How MOSFET is better than other bipolar devices in VLSI technology?
Option A:	Dimension of MOSFET device can be scaled down
Option B:	MOSFET is faster than Biploar device
Option C:	MOSFET is slower than Bipolar device
Option D:	MOSFET is costly device
2.	State region operation when MOSFET acts as current source
Option A:	Triode region
Option B:	Deep Triode region
Option C:	Saturation region
Option D:	Breakdown region
3.	Frequency compensation of two stage opamp can be achieved by
Option A:	Miller compensation resistor
Option B:	Miller compensation capacitor
Option C:	Miller compensation inductor
Option D:	Miller compensation transistor
4.	The advantage of using source degeneration resistor in Common source amplifier is to provide:
Option A:	Huge gain
Option B:	Non-Linearity behavior of amplifier
Option C:	Linearity behavior of amplifier
Option D:	Less gain
5.	Which of these OPAMPS operates at highest speed?
Option A:	Telescopic
Option B:	Folded Cascode
Option C:	Two-Stage
Option D:	Gain- Boosted
6.	For Common Gate Stage Amplifier, the small signal voltage gain is
Option A:	$g_m(1+\eta)R_D$
Option B:	$-g_m(1+\eta)R_D$
Option C:	$g_m(1-\eta)R_D$

Option D:	$-g_m(1-\eta)R_D$
7.	OP AMPs used in feedback circuits exhibits a large signal behavior called _____
Option A:	CMRR
Option B:	Slewing
Option C:	PSRR
Option D:	Common mode feedback
8.	In two stage operational amplifier, first stage is used for _____ and second stage is used for _____
Option A:	Low gain and high swing
Option B:	High gain and low swing
Option C:	High swing and Low gain
Option D:	High gain and High swing
9.	In MOS small signal model, a current source connected between D and S of value $g_m V_{BS}$ is used to model
Option A:	The influence of bulk potential
Option B:	The influence of channel length modulation
Option C:	The influence of source potential
Option D:	The influence of gate potential
10.	Calculate the output resistance of an NMOS device operating in saturation with I_d= 0.4mA and Channel length modulation coefficient λ_n= 0.1/V.
Option A:	10 k-ohm
Option B:	25 k-ohm
Option C:	15 k-ohm
Option D:	20 k-ohm
11.	In differential amplifier, the magnitude of differential gain is equal to _____ regardless of how the inputs are applied
Option A:	$2g_m R_d$
Option B:	$g_m R_d$
Option C:	$(g_m R_d)/2$
Option D:	$2g_m$
12.	The desirable parameter to achieve high speed in MOSFET switches is
Option A:	Use of MOSFET with large aspect ratio
Option B:	Use of large sampling capacitor
Option C:	Use of MOSFET with large on resistance Ron
Option D:	Use of lower supply voltage in the circuit
13.	In a differential amplifier, if the output is single ended then the gain is____
Option A:	doubled
Option B:	zero
Option C:	halved
Option D:	infinite
14.	The trap and release of charge carriers in dangling bond present at interface

	between gate oxide and silicon results in _____ Noise
Option A:	Thermal Noise
Option B:	Environmental Noise
Option C:	White Noise
Option D:	Flicker Noise
15.	The problem of charge injection in MOSFET switches cannot be resolved through
Option A:	Use of dummy switch with main transistor alternately switching on & off
Option B:	Use of complementary switches
Option C:	Use of differential sampling circuits
Option D:	Varying the supply voltage applied
16.	The oscillation frequency of a 5 stage ring oscillator in 1 μm process using inverters (given C_{oxn} = 17.15 fF, C_{oxp} = 52.5 fF, $R_n = R_f$ = 1.5 kohm) is
Option A:	0.66 GHz
Option B:	0.41 GHz
Option C:	0.24 GHz
Option D:	0.54 GHz
17.	The range of frequencies over which the PLL can acquire lock with an input signal is called
Option A:	Lock in range
Option B:	Tracking range
Option C:	Capture range
Option D:	Free running range
18.	Antenna effect in MOSFETs occurs for any
Option A:	Large piece of conductive material tied to the gate
Option B:	Large piece of conductive material tied to the source
Option C:	Large piece of conductive material tied to the drain
Option D:	Large piece of conductive material tied to the bulk
19.	The Full custom design methodology for designing integrated circuits
Option A:	Needs less design time
Option B:	Results in increased complexity
Option C:	Offers more cost as compared to semicustom design
Option D:	Uses pre designed logic cells
20.	Consider the circuit of Figure below with $(W/L)_1$= 90/ 0.5 and $(W/L)_2$= 10/ 0.5. Assume λ= γ= 0. The small signal gain when M1 is at the edge of triode region is
Option A:	2.9
Option B:	-2.0
Option C:	-1.5
Option D:	-3.0

Q2.	Solve any Two Questions out of Three (10 marks each)
A	What is bandgap reference? In short describe various methods of implementation of bandgap references.
B	For common source stage with diode connected load, if variation of η=gmb/gm with output voltage is neglected, prove that gain is independent of bias current and voltage.
C	Derive equation of differential gain, common mode gain and CMRR of differential amplifier.

Q3.	Solve any Two Questions out of Three (10 marks each)
A	Explain the stability issues and frequency compensation of two stage operational Amplifier.
B	Explain the working principle of charge pump PLL.
C	Draw and explain the AMS design flow.

University of Mumbai
Examination 2020 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)
Examinations Commencing from 23rd December 2020 to 6th January 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev 2012
Examination: BE   Semester VIII
Course Code: EXC8041 and Course Name: Robotics

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.	Which of the following is not the type of Robot motion
Option A:	Revolute Motion
Option B:	Translational Motion
Option C:	Prismatic Motion
Option D:	Oscillatory Motion
2.	Which one is a Screw transformation
Option A:	$Rot(\theta,3)*Tran(\lambda,3)$
Option B:	$Rot(\theta,3)*Rot(\lambda,3)$
Option C:	$Rot(\theta,2)*Tran(\lambda,3)$
Option D:	$Rot(\theta,3)*Tran(\lambda,2)$
3.	Yaw is considered as motion with respect to
Option A:	X axis
Option B:	Y axis
Option C:	Swing
Option D:	Rotation about the joint axis
4.	Given a desired position p and orientation R for the tool, find values for the joint variables q which satisfy the arm matrix equation is called problem of _____.
Option A:	Forward kinematics
Option B:	Inverse kinematics
Option C:	Statics
Option D:	Mechanics
5.	Systematic method of assigning (n+1) RHOCF to various links, joints, tool-tip of robot arm is defined as
Option A:	Newton Euler formulation
Option B:	Bug Algorithms
Option C:	Denavit-Hatenberg representation
Option D:	Template matching
6.	Definition of Shrink Operators
Option A:	Shrink(i).I(k,j)= I(k,j) OR 1(i-1-[8-p(k,j)]) ; 0≤i≤8
Option B:	Shrink(i).I(k,j)= I(k,j) OR 1[p(k,j)-i)] ; 0≤i≤8
Option C:	Shrink(i).I(k,j)= I(k,j) AND 1(i-1-[8-p(k,j)]) ; 0≤i≤8

Option D:	Shrink(i).I(k,j)= I(k,j) AND 1(i-1-[8+p(k,j)]) ; 0≤i≤8
7.	The rotation matrix representing differential rotation about x-axis will be
Option A:	$\begin{bmatrix} 1 & -\delta x & 0 & 0 \\ \delta x & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 & 0 & -\delta z & 0 \\ \delta z & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
Option C:	$\begin{bmatrix} 1 & 0 & -\delta x & 0 \\ \delta x & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
Option D:	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & -\delta x & 0 \\ 0 & \delta x & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
8.	The reach and stroke of a robotic manipulator are rough measures of the-------
Option A:	load carrying capacity
Option B:	size of the work envelope
Option C:	maximum speed
Option D:	repeatability
9.	The technique is to recognize whether or not a given part is a member of a particular class of parts called as
Option A:	Visibility map
Option B:	Template matching
Option C:	Bug Algorithms
Option D:	Voronoi diagrams
10.	------ algorithm is used for obtaining obstacle collision free path in the work space of robot from source to the goal.
Option A:	Link coordinate diagrams
Option B:	Single line diagram
Option C:	Generalized Visibility diagrams
Option D:	Generalized Voronoi diagrams
11.	Kinematic Parameters are
Option A:	Yaw parameters
Option B:	Pitch parameters
Option C:	Joint and link parameters
Option D:	Shoulder and elbow joints

12.	Rotation matrix R1(θ)for the rotation about f1 axis is
Option A:	[1 0 0;0 cos(θ) -sin(θ);0 sin(θ) cos(θ)]
Option B:	[1 cos(θ) 0;0 cos(θ) -sin(θ);0 sin(θ) cos(θ)]
Option C:	[1 cos(θ) -sin(θ);0 1 0;0 sin(θ) cos(θ)]
Option D:	[1 0 0;1 cos(θ) -sin(θ);0 sin(θ) cos(θ)]
13.	----is an exhaustive search algorithm looks at all choices before solving motion-planning problem and ----- is a greedy algorithm takes the first thing that looks better.
Option A:	BUG 2, BUG 1
Option B:	BUG 1, BUG 2
Option C:	BUG 0, BUG 1
Option D:	BUG 1, BUG 0
14.	In template matching using Normalized Cross correlation(NCC) value of the function 'σ' for the perfect match is
Option A:	σ=0
Option B:	σ=1
Option C:	σ=2
Option D:	σ=minimum
15.	----is the time sequence of position, velocity and acceleration for each joint of the robot
Option A:	Path
Option B:	Plane
Option C:	Trajectory
Option D:	Degree of freedom
16.	Which of the following is not the type of trajectory
Option A:	Pick and place trajectory
Option B:	Curved line motion trajectory
Option C:	Continuous path trajectory
Option D:	Interpolated motion trajectory
17.	The ----- model of robotic arm is derived using both the Lagrange-Euler formulation and the Newton-Euler formulation.
Option A:	dynamic
Option B:	direct Kinematics
Option C:	inverse Kinematics
Option D:	Forward Kinematics
18.	Application of pick and place operation could be in
Option A:	Welding
Option B:	Spray Painting
Option C:	Packing
Option D:	Stitching
19.	The ------- of a polygon P with polygonal holes or obstacles is a graph whose vertex set consists of the vertices of P and whose edges are visible pairs of vertices.

Option A:	Tangent Graph
Option B:	Cell decomposition
Option C:	Visibility Graph
Option D:	Voronoi Diagram
20.	If K is Kinetic Energy and P is Potential Energy the equation for Lagrangian could be
Option A:	L=K+P
Option B:	L=K-P
Option C:	L=K*P
Option D:	L=K/P

Q2 (20 Marks)	
A	**Solve any Two 5 marks each**
i.	*Explain attractive and repulsive potential functions*
ii.	*Explain shape analysis of images*
iii.	*Write short note on classification of robots*
B	**Solve any One** **10 marks each**
i.	*Write short note on Direct Perspective transformation and Indirect Perspective transformation.*
ii.	*Suppose that $[q]^M = [0,0,10,1]^T$ represents the homogeneous coordinates of a point located 10 units along the third vector of a mobile coordinate frame M. Suppose that initially M is coincident with a fixed coordinate frame F. If rotate the mobile M frame by $\Pi/4$ radians about the first unit vector of F, find the resulting homogeneous coordinate transformation matrix and the physical coordinates of the point q in the fixed coordinate frame F following the given rotation?*

Q3. (20 Marks)	
A	**Solve any Two 5 marks each**
i.	*Explain Denavit-Hatenberg representation of forward kinematics.*
ii.	*Explain Trajectory planning.*
iii.	*Consider the grey scale image of size (4X4) and template of size (2X3) as shown in fig. Find at what position the best match occur using the performance index value and what its value at that position?*
B	**Solve any One** **10 marks each**
i.	*Explain inverse kinematics of a Two Axis Planar Articulated Robot.*
ii.	***Explain Dynamic analysis of 2 axis robot***

For Q3 A iii:

4X4 image:

1	0	0	2
0	1	2	0
2	0	2	1
0	1	0	0

(4X4)

2X3 template:

0	2	0
1	2	3

(2X3)

University of Mumbai
Examination 2020 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)
Examinations Commencing from 23rd December 2020 to 6th January 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev 2012
Examination: BE Semester VIII
Course Code: EXC 8042 and Course Name: Mobile Communication

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 a regular hexagonal geometry pattern, the number of cells in a cluster formed by I = 2 and J = 2 are
Option A:	4
Option B:	7
Option C:	9
Option D:	12
2.	WiMAX is a subset of _____standard
Option A:	IEEE 802.2
Option B:	IEEE 802.16
Option C:	IEEE 802.11
Option D:	IEEE 802.1
3.	Trunking in a cellular network refers to
Option A:	Termination of a call
Option B:	Spectrum unavailability
Option C:	Accommodating large number of users in limited spectrum
Option D:	Monitoring of Handoff
4.	Quality of service in a mobile network is affected by
Option A:	transmission errors and the quality of audio received
Option B:	network connectivity, effective bandwidth availability, connection reliability, and data loss probability
Option C:	atmospheric conditions and the number of simultaneous active mobile users
Option D:	network load and the data lost per second
5.	GPRS and EDGE supports which 2G standard?
Option A:	GSM only
Option B:	IS-136 only
Option C:	GSM and IS-136 both
Option D:	PDC
6.	What is the name of the database that stores subscriber information under an MSC and his eligible services?
Option A:	MSC
Option B:	HLR

Option C:	EIR
Option D:	AuC
7.	Network that offers Anytime-Anywhere-Any Device paradigm is called _____.
Option A:	Adhoc Network
Option B:	Infrastructure Network
Option C:	Fixed Network
Option D:	Portable Network
8.	The IEEE 802.11 standard for WLANs employs a version of _____protocol.
Option A:	ALOHA
Option B:	PRMA
Option C:	CSMA
Option D:	TDMA
9.	In CDMA IS_95, reverse channel structure allows upto---------different traffic channels and -------- different access channels
Option A:	24,48
Option B:	32,64
Option C:	62, 32
Option D:	24,32
10.	The design process of selecting and allocating channel groups for all the cellular basestations within a system is called
Option A:	Umbrella Approach
Option B:	Sectoring
Option C:	Splitting
Option D:	Frequency Reuse
11.	Which receivers are commonly used in DSSS receivers in CDMA cellular mobile phones which enables to provide a robust signal reception in a hostile mobile radio environment?
Option A:	Rake Receiver
Option B:	Optimum Receiver
Option C:	Coherent Receiver
Option D:	Non-Coherent Receiver
12.	Which type of data is carried by the entire frame of the reverse traffic channel?
Option A:	Voice data and text data
Option B:	Voice traffic and signaling data
Option C:	Voice, text, image data
Option D:	Voice, text and video data
13.	The approximate data rate of 4G Wireless systems is
Option A:	1 Mbps
Option B:	200 Mbps
Option C:	100 Kbps
Option D:	10 Kbps

14.	For UMTS Network technology, channel bandwidth is _____
Option A:	28MHz
Option B:	50MHz
Option C:	90MHz
Option D:	5MHz
15.	The IS-95 CDMA cellular system employs --------- modulation method.
Option A:	Binary Phase Shift keying
Option B:	Quadrature Amplitude Modulation
Option C:	Direct sequence spread spectrum (DSSS)
Option D:	Quadrature Frequency Shift Keying
16.	How many users are supported by Cdma2000 1X in comparison to 2G CDMA standard?
Option A:	Half
Option B:	Twice
Option C:	Six times
Option D:	Ten times
17.	The main source of power consumption in wireless sensor networks is due to-
Option A:	Processing
Option B:	Sensing
Option C:	Transmitting
Option D:	Storing
18.	Agent discovery protocols entails
Option A:	first listening to foreign agent advertisement for COAs and if not found then agent solicitation at defined intervals
Option B:	registering with a foreign agent and waiting for registration reply from the home agent
Option C:	first agent solicitation and then if COA is not found, listening to foreign agent advertisement
Option D:	requesting foreign
19.	In LTE specification, uplink data rate is approximately-
Option A:	10-15 Mbps
Option B:	200- 300 Mbps
Option C:	1-5 Mbps
Option D:	50-100 Mbps
20.	GSM frame contains _____slot and each slot is with duration_____.
Option A:	8; 577microsecond
Option B:	10; 488 microseconds
Option C:	12; 577microsecond
Option D:	5; 488 microseconds

Q2	
A	**Solve any Two 5 marks each**
i.	Differentiate between GSM and CDMA technologies

ii.	Draw the block diagram of 4G LTE architecture
iii.	Comparison between MANETs and WSNs
B	**Solve any One** **10 marks** **each**
i.	Assume a cellular system of 32 cells with a cell radius of 1.6km, a total spectrum allocation that supports 336 traffic channels and a reuse pattern of 7. Calculate the total service area covered with this configuration, the number of channels per cells, and a total system capacity, Assume regular hexagonal cellular topology. i) Let the cell size be reduced to the extent that the same area as covered in part i) with 128 cells. Find the radius of the new cell and new system capacity. iii) Comment on the result.
ii.	Explain GSM architecture in detail

Q3	
A	**Solve any Two 5 marks each**
i.	How is power control mechanism different in IS-95, Cdma2000 and W-CDMA .
ii.	What are the key features of LTE.
iii.	Comparison between Fixed WiMAX and Mobile WiMAX
B	**Solve any One** **10 marks** **each**
i.	Calculate the number of set-up channels and voice channels per cell for a cellular system having a total spectrum allocation of 60 MHz which uses two 25 kHz simplex channels to provide full duplex set up and voice channels. Assume that the system is designed with nine cell frequency reuse pattern and 1 MHz of he total spectrum is exclusively allocated for set-up channels.
ii.	Draw the architecture for GPRS technology.

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(Lead College: Vidyavardhini's College of Engg Tech)
Examinations Commencing from 23rd December 2020 to 6th January 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev 2012
Examination: BE   Semester: VIII
Course Code: EXC8043   Course Name: Digital Control System
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.	Impulse invariance method is useful for discretizing _____signal.
Option A:	Band Limited
Option B:	Infinite Band
Option C:	Unlimited Band
Option D:	Specific band
2.	The state model of the transfer function G(s) = (z+3) / (z+1) is,
Option A:	A= 1, B= 1, C= 1, D= 1
Option B:	A= -1, B= 2, C= 1, D= 1
Option C:	A= 1, B= 1, C= 2, D= 1
Option D:	A= -1, B= 1, C= 2, D= 1
3.	The deadbeat response has not the following characteristic
Option A:	Zero steady-state error
Option B:	Minimum rise time
Option C:	Maximum settling time
Option D:	Very high control signal output
4.	Z transform for a discretized unit step input is given by_____.
Option A:	z/z-1
Option B:	z/z+1
Option C:	z+1/z
Option D:	z-1/z
5.	A digital control system will be _____if all the roots of its characteristic equation lie within a unit circle in z plane.
Option A:	Absolutely Stable
Option B:	Marginally Stable
Option C:	Unstable
Option D:	Instable
6.	To design a pole placement controller, for a system, x(k + 1) = Ax(k) + Bu(k) . y(k) = Cx(k) + Du(k)

	which of the following is true?
Option A:	Pair(A,C) is controllable
Option B:	Pair(A,B) must be observable
Option C:	Pair(A,C) is observable
Option D:	Pair(A,B) must be controllable
7.	According to Separation Principle, the pole-placement design and the design of the reduced order observer are _____ of each other
Option A:	dependent
Option B:	independent
Option C:	invariant
Option D:	identical
8.	For a discrete time system described by 3 difference equations, what is the order of system matrix A, in the following equation? $x(k+1) = Ax(k) + Bu(k), \ y(k) = Cx(k)$
Option A:	3×2
Option B:	3×3
Option C:	2×3
Option D:	2×2
9.	The eigenvalues of matrix A in state variable model, are also called as
Option A:	Closed loop poles
Option B:	Open loop poles
Option C:	Open loop zeros
Option D:	Closed loop zeros
10.	The system matrix *A* in observable canonical form is _____ of the system matrix in controllable canonical form
Option A:	same
Option B:	inverse
Option C:	negative
Option D:	transpose
11.	A system with one pole at z=1, in discrete transfer function has _____ position error and _____ acceleration error at steady state
Option A:	zero, zero
Option B:	zero, infinite
Option C:	infinite, infinite
Option D:	infinite, zero
12.	A system with transfer function G(z) to be BIBO stable, it is necessary and sufficient that
Option A:	$\sum_{k=0}^{\infty}|g(k)| > \infty$
Option B:	$\sum_{k=0}^{\infty}|g(k)| < \infty$
Option C:	$\sum_{k=0}^{\infty}|g(k)| < 0$
Option D:	$\sum_{k=0}^{\infty}|g(k)| = 0$

13.	Realization of Pulse Transfer function means determining the _____layout for appropriate combination of arithmetic and storage operations
Option A:	PCB
Option B:	Signal
Option C:	Block diagram
Option D:	Physical
14.	Which of the following relations holds good for Backward Difference Approximation, given s and z are continuous and discrete domain frequency variables, T is sampling time
Option A:	$s = 1/T$
Option B:	$s = z/T$
Option C:	$s = \dfrac{1 - z^{-1}}{T}$
Option D:	$z = T/s$
15.	The magnitude frequency response of ZOH has a cut off at _____the sampling frequency and the magnitude is_____
Option A:	Double, 0.5
Option B:	Half, 0.707
Option C:	Half, 0.314
Option D:	Half, 0.636
16.	For an nth order system, the number of rows in the Jury's table is
Option A:	2n-1
Option B:	3n+1
Option C:	2n-3
Option D:	3n-1
17.	The device that performs a sampling, quantization and coding is,
Option A:	Comparator
Option B:	Compressor
Option C:	Analogue to digital converter
Option D:	Digital to analogue converter
18.	The control law using state feedback, given by expression u(k)= -Kx(k)+br(k), u(k)is controller output, K is controller gain, x(k)-state vector, r(k), reference input gives
Option A:	Tracking Control
Option B:	Regulatory Control
Option C:	Feedback Control
Option D:	Forward Control
19.	The signals for which time is_____ and amplitude is_____ are called digital signals
Option A:	continuous, continuous
Option B:	continuous, discrete

Option C:	discrete, continuous
Option D:	discrete, discrete
20.	For a given deference equation, y(n) = x(n) – 2y(n-2), the order of discrete transfer function is
Option A:	0
Option B:	1
Option C:	2
Option D:	3

Q2	Solve any Two Questions out of Three 10 marks each
A	Explain Digital Control System with neat block diagram. State Sampling theorem. Explain folding and aliasing in brief.
B	Explain Mason's gain formula for Signal Flow Graph.
C	Determine the stability of the system having characteristics equation $P(z) = z^4 – 1.2\ z^3 + 0.07\ z^2 + 0.3\ z – 0.08 = 0$ using Jury's Stability Criterion

Q3.	Solve any Two Questions out of Three 10 marks each
A	Define Controllability and Observability of a system. State the significance of the same in control system design. Discuss ant one method to determine Controllability and Observability of a system.
B	Explain pole placement method using Ackerman's formula.
C	A feedback system has a closed loop transfer function $Y(s)/R(s) = 10(s+4)\ /\ s(s+1)(s+3)$ Construct three different state models for this system: i) one where the system matrix A is diagonal matrix ii) one where A is in first companion form iii) one where A is in second companion form

University of Mumbai
Examination 2020 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)
Examinations Commencing from 23rd December 2020 to 6th January 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev 2012
Examination: BE Semester VIII
Course Code: EXC8044 and Course Name: Biomedical Electronics

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.	Which type of leads will have higher potential
Option A:	Augmented leads
Option B:	precordial leads
Option C:	Bipolar leads
Option D:	Simple leads
2.	The heart rate can vary according to
Option A:	body's physical needs
Option B:	physical fitness
Option C:	psychological status
Option D:	Physical needs, fitness and psychological status
3.	Which type of filter is employed to reduce the hum noise generated by the power supply in the ECG circuit?
Option A:	band pass filters
Option B:	high pass filters
Option C:	notch filters
Option D:	low pass filters
4.	What is the frequency range of ECG?
Option A:	0.05-150 kHZ
Option B:	50-500 Hz
Option C:	5-50 kHz
Option D:	0.05-120 Hz
5.	Blood pressure is the pressure exerted by blood against _____
Option A:	Kidneys
Option B:	Arterial walls
Option C:	Brain
Option D:	Stomach
6.	Are CT and CAT scan the same?
Option A:	Same
Option B:	Not same
Option C:	Cannot say

Option D:	Have some relation
7.	What is the function of the X ray tube?
Option A:	An x-ray tube functions as a specific energy converter, receiving the electrical energy and converting it into two other forms of energy: x-radiation and heat.
Option B:	An x-ray tube functions as a specific energy converter, receiving the electrical energy and converting it into two other forms of energy: x-radiation and ions.
Option C:	An x-ray tube functions as a specific energy converter, receiving the electrical energy and converting it into two other forms of energy: UV-radiation and heat.
Option D:	An x-ray tube functions as a specific energy converter, receiving the mechanical energy and converting it into two other forms of energy: x-radiation and heat .
8.	What is the basic principle of CT scan?
Option A:	CT is based on the fundamental principle that the density of the tissue passed by the x-ray beam can be measured from the calculation of the attenuation coefficient.
Option B:	CT is based on the fundamental principle that the density of the bones passed by the x-ray beam can be measured from the calculation of the attenuation coefficient.
Option C:	CT is based on the fundamental principle that the density of the tissue passed by the UV-ray beam can be measured from the calculation of the attenuation coefficient.
Option D:	CT is based on the fundamental principle that the density of the tissue passed by the x-ray beam can be measured from the calculation of the absorbance coefficient.
9.	Surface electrode can be used to sense
Option A:	ECG
Option B:	EEG
Option C:	ECG, EEG, or EMG potentials
Option D:	EMG
10.	Which statement is true
Option A:	R-wave amplitude of lead II is equal to the sum of the R-wave amplitudes of leads I and III.
Option B:	R-wave amplitude of lead I is equal to the sum of the R-wave amplitudes of leads II and III.
Option C:	R-wave amplitude of lead III is equal to the sum of the R-wave amplitudes of leads I and II.
Option D:	I+II+III
11.	Lead I is the potential difference between
Option A:	right arm (RA) electrode and left arm (LA) electrode:
Option B:	left arm (LA) electrode and right leg(RL) electrode:
Option C:	right leg (RL) electrode and right arm (RA) electrode:
Option D:	RA+RL+LA

12.	The ability of the preamplifier to reject common voltages on its two input leads is known as
Option A:	common mode rejection rate
Option B:	coupled mode rejection rate
Option C:	common mode rejection ratio
Option D:	coupled mode rejection ratio
13.	A Coulter Counter is able to
Option A:	Count Complete Blood Count
Option B:	Only RBC
Option C:	Only WBC
Option D:	Only platelets
14.	According to the international 10/20 system to measure EEG, even number denotes which side of the brain?
Option A:	Left
Option B:	Top
Option C:	Bottom
Option D:	Right
15.	The Beer-Lambert law
Option A:	is a linear relationship between the absorbance and the concentration, molar absorption coefficient and optical coefficient of a solution
Option B:	is a non linear relationship between the absorbance and the concentration, molar absorption coefficient and optical coefficient of a solution
Option C:	is a logarithmic relationship between the absorbance and the concentration, molar absorption coefficient and optical coefficient of a solution
Option D:	Has no relationship between the absorbance and the concentration, molar absorption coefficient and optical coefficient of a solution
16.	The main components of a heart–lung machine are a
Option A:	pump (to provide the driving force to the blood in the arterial system),
Option B:	an oxygenator (for exchange of oxygen and carbon dioxide),
Option C:	a heat exchanger (to allow control of temperature of the body)
Option D:	Pump+ oxygenator+ heat exchanger
17.	The principal modes of ultrasound used in echocardiography are
Option A:	2-D, M-mode, Colour flow doppler imaging, Pulse wave Doppler, Continuous wave Doppler, Tissue doppler
Option B:	Continuous wave Doppler, Tissue doppler
Option C:	Colour flow doppler imaging, Pulse wave Doppler
Option D:	2-D, M-mode
18.	Haemodialysis utilizes
Option A:	counter current flow, where the dialysate is flowing in the downward direction to blood flow in the extracorporeal circuit.
Option B:	counter current flow, where the dialysate is flowing in the same direction to blood flow in the extracorporeal circuit.
Option C:	counter current flow, where the dialysate is flowing in the upward direction to blood flow in the extracorporeal circuit.
Option D:	counter current flow, where the dialysate is flowing in the opposite direction to

	blood flow in the extracorporeal circuit.
19.	The volume that flows across a heart valve in any moment (dV) is equal to
Option A:	the duration of the moment (dt) multiplied by velocity of blood (v) and the cross sectional area of the valve (A).
Option B:	Blood pumped
Option C:	Total blood in RA chamber
Option D:	Blood flow volume
20.	Pacemakers are electric activity generating devices which are used for the treatment of patients
Option A:	with fast heart rate, or symptomatic heart blocks and in patients with heart failure
Option B:	Suffering with heart attack
Option C:	with slow heart rate, or symptomatic heart blocks and in patients with heart failure
Option D:	With asthma

Q2 **(20 Marks)**	**Subjective/Descriptive Questions**
A	**Solve any Two, 5 marks each**
i.	What do you mean by Bio-potential signals? Explain action potential & resting potential with suitable diagrams.
ii.	Explain the terms Electrocardiography (ECG), Electroencephalography (EEG) and Electromyography (EMG) in detail
iii.	Differentiate between afferent and efferent nerves.
B	**Solve any One, 10 marks each**
i.	Using suitable diagram, demonstrate indirect method of blood pressure measurement.
ii.	Write short notes on Ultrasonic and Electromagnetic blood flow measurement techniques.
Q3 **(20 Marks)**	**Subjective/Descriptive questions**
A	**Solve any Two, 5 marks each**
i.	Illustrate the different types of pacing modes of pacemaker.
ii.	Explain the Baby Incubator with neat diagram.
iii.	State Beer Lambert's law. Illustrate spectrophotometer with suitable diagram.
B	**Solve any One,10 marks each**
i.	Explain the construction and working principle of X-ray tube. List the applications of X-ray.
ii.	Explain the Haemodialysis machine with neat diagram.