University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: ELX601 and Course Name: Embedded Systems and Real Time Operating System

Time: 2 hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	_____circuit prevents the processor/controller from unexpected program execution behavior when the supply voltage to the processor/controller falls below a specified voltage.
Option A:	Reset
Option B:	Brown out protection
Option C:	Watchdog
Option D:	Programmable Peripheral Interface
2.	A _____is a computer program that operates or controls a particular type of device that is attached to a computer.
Option A:	device disk
Option B:	ISR
Option C:	device driver
Option D:	IPC
3.	In Black Box Testing, the tester_____
Option A:	is not knowing the internal architecture or structure/techniques of the functional block to be tested.
Option B:	is fully aware the internal architecture or structure/techniques of the functional block to be tested.
Option C:	is independent and has no idea of data, requirements or specifications.
Option D:	is not required.
4.	The smart card reader communicates with a desktop machine by implementing a communication channel using _____
Option A:	RS-232 C
Option B:	ZigBee
Option C:	GPRS
Option D:	RS-485
5.	The most important phase in software life cycle is
Option A:	Integration
Option B:	Design

Option C:	Testing
Option D:	Debugging
6.	_____is a timing device that resets the system after a predefined timeout
Option A:	Real time clock
Option B:	Reset circuit
Option C:	Watchdog timer
Option D:	Power down mode
7.	_____is fast in operation due to its resistive networking and switching capabilities
Option A:	NVRAM
Option B:	DRAM
Option C:	SRAM
Option D:	RAM
8.	_____is a term used to describe a situation when a higher priority task cannot execute because it is waiting for a low priority task to complete.
Option A:	IPC
Option B:	Priority Inheritance Protocol
Option C:	Priority Inversion
Option D:	Priority Ceiling
9.	The two common kinds of semaphores are_____
Option A:	Binary and Counting
Option B:	Primary and Secondary
Option C:	Signal and Pipe
Option D:	Single and Mailbox
10.	_____is used to acquire semaphore in uCOS-II.
Option A:	OSSemPost( )
Option B:	OSSemphore ( )
Option C:	OSSemAcq ( )
Option D:	OSSemPend( )
11.	The fundamental building blocks of UML are _____
Option A:	Structure and behaviour
Option B:	Things, relationships and diagrams
Option C:	Objects and classes
Option D:	Use case and sequence diagrams
12.	Which of the following is one-time programmable memory?
Option A:	SRAM
Option B:	PROM
Option C:	FLASH
Option D:	NVRAM

13.	Which of the following are the three measures of information security in embedded systems?
Option A:	Confidentiality, secrecy, integrity
Option B:	Confidentiality, integrity, availability
Option C:	Confidentiality, transparency, availability
Option D:	Integrity, transparency, availability
14.	A situation where none of the processes are able to make any progress in their execution is termed as
Option A:	Deadlock
Option B:	Livelock
Option C:	Starvation
Option D:	Racing
15.	The state where a process is incepted into the memory and awaiting the processor time for execution is known as
Option A:	Ready State
Option B:	Blocked State
Option C:	Waiting State
Option D:	Created State
16.	The ability of an operating system to hold multiple process in memory and switch the processor (CPU) from executing one process to another process is called
Option A:	Multitasking
Option B:	Multiprocessing
Option C:	Multiprogramming
Option D:	Multithreading
17.	_____is a sleep and wakeup based mutual exclusion implementation for shared resource access
Option A:	Mutex
Option B:	Remote Procedure call
Option C:	Semaphore
Option D:	Racing
18.	Which is the function call used by an ISR to indicate the occurrence of an interrupt to the MicroC/OS-II Kernel
Option A:	Interrupt
Option B:	OSIntEnter
Option C:	OSIntExit
Option D:	OSIdle
19.	RS 232 is not suitable for _____ communications.
Option A:	Point to Point
Option B:	Multi Drop
Option C:	2 Wire communication
Option D:	Mesh network

20.	_____is not a task type.
Option A:	Periodic
Option B:	Sporadic
Option C:	Priority Inversion
Option D:	Aperiodic

2 **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	What is the role of sensor and transducer in Embedded System design? Illustrate with an example.
B	Explain the different types of UML diagram and their significance in each stage of the system development life cycle.
C	Explain Rate Monotic Scheduling Algorithm; State its advantages and disadvantages.

Q Q3. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Design a Car Cruise-control using uCOS II RTOS. Support the design with requirements, hardware and software architecture.
B	Write a short not on: Hardware-Software Co-design
C	What are the different types of Inter-process communication? Explain any two in detail.

University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code:ELX602 and Course Name: Computer Communication and Networks

Time: 2 hour Max. Marks: 80

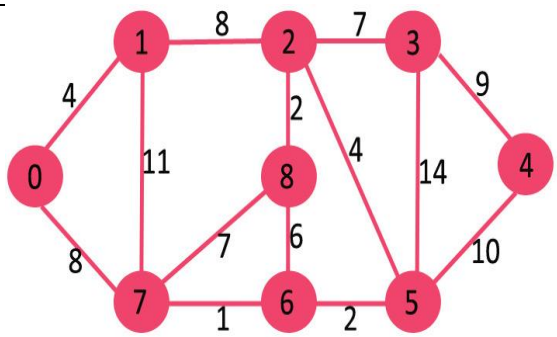
==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	We add r redundant bits to each block to make the length n = k + r. The resulting n-bit blocks are called _____
Option A:	Blockword
Option B:	Dataword
Option C:	Code word
Option D:	Word
2.	Which error detection method uses one's complement arithmetic?
Option A:	Simple parity check
Option B:	CRC
Option C:	Two-dimensional parity check
Option D:	Checksum
3.	Automatic repeat request error management mechanism is provided by _____.
Option A:	logical link control sublayer
Option B:	media access control sublayer
Option C:	network interface control sublayer
Option D:	application access control sublayer
4	In PURE ALOHA, vulnerable time is _____frame transmission time.
Option A:	the same as
Option B:	two times
Option C:	three times
Option D:	four times
5.	Devices in a ring or mesh topology are usually configured in a _____relationship
Option A:	Peer to peer
Option B:	Point to Point
Option C:	primary to secondary
Option D:	Master & slave
6.	In a mesh topology with n devices, if a new device is added, _____new links are needed.
Option A:	n

Option B:	n-1
Option C:	n+1
Option D:	2n
7.	A device that helps prevent congestion and data collisions is _____.
Option A:	Switch
Option B:	Hub
Option C:	Gateway
Option D:	Proxy Server
8.	In the Ethernet frame, the _____ field contains error detection information.
Option A:	Address
Option B:	Preamble
Option C:	CRC
Option D:	Type
9.	In the Ethernet, the _____field is actually added at the physical layer and is not (formally) the part of the frame.
Option A:	address
Option B:	CRC
Option C:	Preamble
Option D:	Type of protocol
10.	The MAC (Media Access Control) address of the network card is used in both Ethernet and Token-Ring networks and is essential for communication. What does MAC provide?
Option A:	An alias for the computer name.
Option B:	The logical domain address for the workstation.
Option C:	A physical address that is assigned by the manufacturer.
Option D:	A physical address that is randomly assigned each time the computer is started.
11.	An address in a block is 180.8.17.9. Find the first address and last address in the block.
Option A:	180.8.0.0 and 180.8.255.255
Option B:	180.8.1.0 and 180.8.255.0
Option C:	180.8.1.1 and 180.8.255.255
Option D:	180.8.0.0 and 180.8.1.1
12.	Prefix length in classless addressing can be _____.
Option A:	1 to16
Option B:	1 to 32
Option C:	1 to 24
Option D:	1 to 8
13.	What is the SUBNET mask for a class C Network?
Option A:	255.0.0.0
Option B:	255.255.255.0
Option C:	255.255.0.0

Option D:	255.255.255.255
14.	Which of the following is the Protocol of Application layer ?
Option A:	TCP
Option B:	UDP
Option C:	SCTP
Option D:	DNS
15.	To deliver a message to the correct application program running on a host, the _____ address must be consulted.
Option A:	IP
Option B:	MAC
Option C:	Port
Option D:	Physical
16.	What is the hexadecimal equivalent of the Ethernet address 01011010 00010001 01010101 00011000 10111010 11111111?
Option A:	5A:88:AA:18:55:F0
Option B:	5A:81:BA:81:AA:0F
Option C:	5A:18:5A:18:55:0F
Option D:	5A:11:55:18:BA:FF
17.	User datagram protocol is called connectionless because _____
Option A:	all UDP packets are treated independently by transport layer
Option B:	it sends data as a stream of related packets
Option C:	it is received in the same order as sent order
Option D:	it sends data very quickly
18.	Which connector does the STP cable use?
Option A:	BNC
Option B:	RJ-11
Option C:	RJ-45
Option D:	RJ-69
19.	The default connection type used by HTTP is _____
Option A:	Persistent
Option B:	Non-persistent
Option C:	Can be either persistent or non-persistent depending on connection request
Option D:	reference request
20.	Simple mail transfer protocol (SMTP) utilizes _____ as the transport layer protocol for electronic mail transfer.
Option A:	TCP
Option B:	UDP
Option C:	IP
Option D:	SCTP

Q.2	**Solve any Two Questions out of Three.** **(10 marks each)**
A	What are the functions of layers in the OSI model?
B	Classify the various multiple access methods and explain CSMA-CD in detail.
C	What is traffic shaping? Explain leaky bucket technique and Token Bucket technique of traffic shaping.

Q.3	**Solve any Two Questions out of Three.** **(10 marks each)**
A	Define the utilization or efficiency of the line and derive the expression for stop and wait flow control. Calculate the maximum link utilization for following cases: i)stop and wait flow control ii) Sliding window flow control with window sizes of 4 & 7 Link specification: Frame length=5000 bits/frame Velocity of propagation= 2x10^8 m/s, Link distance=30km, Data rate=50 Mbps
B	 Using Dijkstra's shortest path algorithm, find the shortest path
C	An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its three subnets as shown below: ❑One subblock of 120 addresses. ❑One subblock of 60 addresses. ❑One subblock of 10 addresses From above information, design the subnetworks and find the information about each network.

University of Mumbai

Examination 2021 under Cluster 06

(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

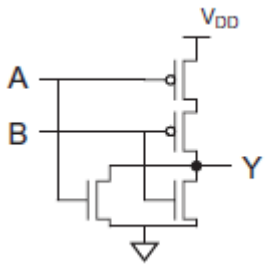
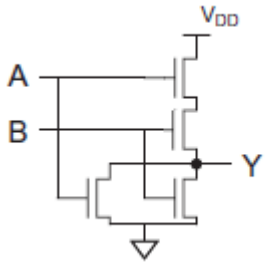
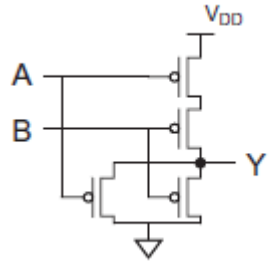
Curriculum Scheme: Rev 2016

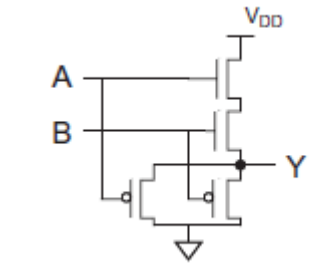
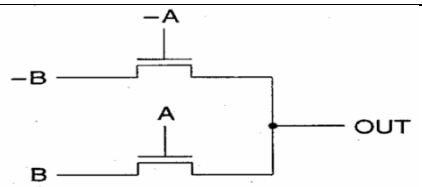
Examination: TE Semester VI

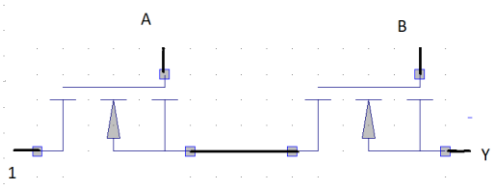
Course Code: ELX603 Course Name:VLSI Design

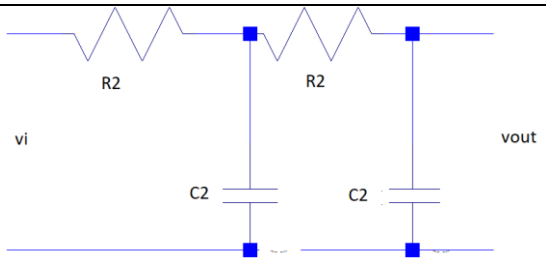
Time: 2 hour Max. Marks: 80

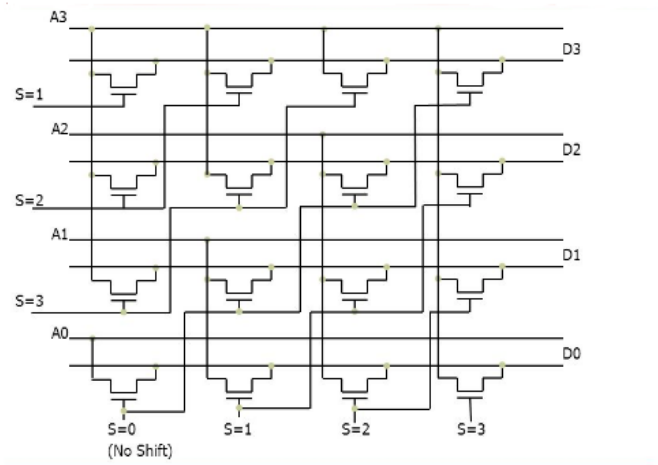
==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The CMOS logic circuit for NOR gate is:
Option A:	
Option B:	
Option C:	

Option D:	
2.	In Pseudo-nMOS inverter logic, the gate of pmos transistor operates is: -
Option A:	Connected to VDD
Option B:	grounded
Option C:	Connected to gate of nmos transistor
Option D:	Kept floated
3.	 (-A indicates complement of A and –B indicates complement of B) Above Circuit is
Option A:	XNOR
Option B:	XOR
Option C:	AND
Option D:	OR
4.	Sense amplifiers are primarily used in: -
Option A:	Memory circuits
Option B:	Adder Circuits
Option C:	Manchester carry chain adders
Option D:	Operational Amplifier
5.	In 6 T SRAM Cell the core is made up of how many inverters
Option A:	4
Option B:	2
Option C:	5
Option D:	6
6.	The capacitance used in 1 T DRAM cell is: -
Option A:	Normal Electrolytic Capacitor
Option B:	Diffusion Capacitance
Option C:	MOSFET capacitance
Option D:	Trench Capacitance
7.	When a CMOS inverter withdraws maximum current from the supply, the two transistors are in _____ region.
Option A:	saturation
Option B:	linear
Option C:	non saturation

Option D:	cut-off
8.	The Manchester Carry-Chain Adder is having a part of ---------- transistors that are used to implement the carry chain.
Option A:	PASS
Option B:	PNP
Option C:	NPN
Option D:	BJT
9.	For the body effect to occur in a MOSFET, substrate is biased with respect to _____
Option A:	Gate
Option B:	Drain
Option C:	Source
Option D:	Body
10.	Ids is _____ to length L of the channel.
Option A:	Square law
Option B:	Logarithmically
Option C:	Directly Proportional
Option D:	Inversely Proportional
11.	 The circuit shows two pass transistors in series. Find the value of Y?
Option A:	Y=A.B
Option B:	Y=A+B
Option C:	Y=A.A
Option D:	Y=B.B
12.	ESD phenomenon stands for
Option A:	Electron Source Detection
Option B:	Electron Static Discharge
Option C:	Electrostatic Discharge
Option D:	Discharged Capacitor
13.	The device in which NMOS and PMOS pair wired in parallel with their sources connected and drains connected is called as
Option A:	Transmission Gate
Option B:	CMOS inverter
Option C:	Pseudo NMOS inverter
Option D:	Manchester circuit
14.	H-tree Distribution to all chip level circuits is used to avoid following error: -
Option A:	Clock skew
Option B:	Clock jitter
Option C:	Charge sharing

Option D:	Charge leakage
15.	Charge Sharing and Charge Leakage Problem in Domino cascade circuits can be removed by
Option A:	Dynamic Circuit
Option B:	Single FET charge keeper circuit.
Option C:	Static CMOS Circuit
Option D:	Clocked CMOS circuits.
16.	The refresh frequency in DRAM cell is
Option A:	$f_{refresh}=1/2t_h$
Option B:	$f_{refresh}=1/3t_h$
Option C:	$f_{refresh}=1/t_h$
Option D:	$f_{refresh}=1/4t_h$
17.	 For the above circuit vi is the input voltage ,vout is the output voltage of the circuit. By Elmore's formula find out the time constant of the circuit.
Option A:	R_2C_2
Option B:	$3R_2C_2$
Option C:	$4R_2C_2$
Option D:	$2R_2C_2$
18.	When Kn>Kp ,Threshold voltage of CMOS Inverter move closer to
Option A:	Zero
Option B:	Infinity
Option C:	Midpoint Value
Option D:	Supply Voltage
19.	In Integrated Chips circuits are connected to each other mostly by: -
Option A:	connection
Option B:	Interconnect
Option C:	wires
Option D:	PCB
20.	Find the name of below diagram

	
Option A:	ROM Memory
Option B:	RAM Memory
Option C:	Barrel Shifter
Option D:	NAND ROM Memory

subjective/descriptive questions

Q2 **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	What is Scaling in VLSI Technology? List the types of scaling and explain any one in detail.
B	Explain CMOS inverter characteristics mentioning it's all regions of operation.
C	Implement Z= $\overline{(A+B+C)\,DE}$ using CMOS static circuit.
D	Draw Schematic of 6T SRAM Cell and Explain it's working
E	Compare pass transistor and transmission gate, list two advantages of transmission gate.
F	Write short note on Importance of low power design in VLSI circuits.

Q3. **(20 Marks Each)**	
A	**Solve any Two out of Three** **5 marks each**
i.	Write short note on Interconnect scaling and crosstalk of the interconnect.
ii.	Draw J-K Flipflop using CMOS and explain its operation.
iii.	Explain concept of precharge and evaluation in Dynamic CMOS circuits
B	**Solve any One out of Two** **10 marks each**
i.	Consider a CMOS Inverter circuit with following parameters VTO,n=0.6 v , VTO,p= -0.7v $\mu nCox=60\ \mu A/V^{2,}$ (W/L) n=8 $\mu pCox=25\ \mu A/V^{2,}$ (W/L) p=12 Calculate noise margin, If the power supply voltage VDD=3.3v
ii.	Compare Ripple carry adder and Carry Lookahead adder, Explain 4-bit CLA adder circuit.

University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: ELX 604 and Course Name: Signals and Systems

Time: 2 hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Determine the signal is periodic or not. If a signal is periodic, specify it's fundamental period of signal $x(n) = e^{j7\pi n}$
Option A:	x(n) is an Aperiodic signal
Option B:	x(n) is Periodic with fundamental period N=2 samples/cycle
Option C:	x(n) is Periodic with fundamental period N=7 samples/cycle
Option D:	x(n) is Periodic with fundamental period N=14 samples/cycle
2.	What is the area of a Unit Impulse function?
Option A:	Zero
Option B:	Half of Unity
Option C:	Depends on the function
Option D:	Unity
3.	Convolution of the sequences of $x_1(n) = x_2(n)=\{1,1,1\}$?
Option A:	{1,1,1,1}
Option B:	{1,2,3,2,1}
Option C:	{1,2,3,1}
Option D:	{1,2,2,1}
4.	A discrete-time system with input x(n) and y(n) related by y(n) = n[x(n)]
Option A:	linear ,time varying, and stable
Option B:	non-linear,time invariant, and unstable
Option C:	non-linear, time varying, and stable
Option D:	linear, time varying, and unstable
5.	What is the Nyquist rate of the following signal $x(t)= 3\cos(50\pi t) + 10\sin(300\pi t) - \cos(100\pi t)$?
Option A:	50 Hz
Option B:	100 Hz
Option C:	200 Hz
Option D:	300Hz

6.	What is the condition for causality in Laplace domain?
Option A:	ROC should be to the right of right most pole
Option B:	ROC should be to the right of right most zero
Option C:	ROC should be to the right of left most pole
Option D:	All the zeros should be in the right half of the s plane
7.	Which type of system response to its input represents the zero value of its initial condition?
Option A:	Zero state response
Option B:	Zero input response
Option C:	Total response
Option D:	Natural response
8.	What is the z-transform of x(n-1) if x(n) has z-transform X(Z)?
Option A:	ZX(Z)
Option B:	[-X(Z)] [Z^1]
Option C:	[X(-Z)] [Z^(-1)]
Option D:	[X(Z)] [Z^(-1)]
9.	A finite- length signal has X (z) = 0.5+0.2 z^{-1} + 0.7 z^{-2} +0.5 z^{-3} ; its ROC is
Option A:	The entire z – plane except z = 0
Option B:	Outside the unit circle
Option C:	Inside the unit circle
Option D:	On the unit circle
10.	The convolution property of the z–transforms states that the inverse z – transform of H (z) X (z) is given by
Option A:	$\sum_{k=0}^{n-1} h(k)x(n-k)$
Option B:	$\sum_{k=0}^{\infty} h(k)x(k-n)$
Option C:	$\sum_{k=-\infty}^{\infty} h(k)x(n-k)$
Option D:	$\sum_{k=-\infty}^{0} h(n-k)x(n)$
11.	Find the Laplace Transform of x (t) = u (t) – u (t –a)
Option A:	$\frac{1-e^{as}}{s}$
Option B:	$\frac{1}{s-a}$
Option C:	$\frac{1-e^{-as}}{s}$

Option D:	$\frac{1}{s+a}$
12.	Find the initial and final values for the following function $X(s) = \frac{s+5}{s^2+3s+2}$
Option A:	initial value =0 and final value= 1
Option B:	initial value =1 and final value= 0
Option C:	initial value = 5 and final value= 3
Option D:	initial value = 3 and final value= 5
13.	The trigonometric Fourier series of a periodic time function can have only _____
Option A:	Only cosine terms
Option B:	Only sine terms
Option C:	Both cosine and sine terms
Option D:	Dc and cosine terms
14.	Which among the below mentioned transform pairs is/are formed between the auto-correlation function and the energy spectral density, in accordance to the property of Energy Spectral Density (ESD)?
Option A:	Laplace Transform
Option B:	Z-Transform
Option C:	Fourier Transform
Option D:	Wavelet Transform
15.	The Fourier transform of the signal $\delta(t+1) + \delta(t-1)$ is _____
Option A:	$2/(1 + j\omega)$
Option B:	$2/(1 - j\omega)$
Option C:	$2 \cos \omega$
Option D:	$2 \sin \omega$
16.	Duality Theorem / Property of Fourier Transform states that …..
Option A:	Shape of signal in time domain & shape of spectrum can be interchangeable
Option B:	Shape of signal in frequency domain & shape of spectrum can be interchangeable
Option C:	Shape of signal in time domain & shape of spectrum can never be interchangeable
Option D:	Shape of signal in frequency domain & shape of spectrum can never be interchangeable
17.	Which theorem states that the total average power of a periodic signal is equal to the sum of average powers of the individual Fourier coefficients?
Option A:	Parseval's Theorem
Option B:	Rayleigh's Theorem
Option C:	Thevenin's Theorem
Option D:	Norton's Theorem
18.	Choose the correct expression for Fourier series coefficient Ck in terms of the discrete signal x(n).

Option A:	$\frac{1}{N}\sum_{n=0}^{N-1} x(n)e^{\frac{j2\pi nk}{N}}$
Option B:	$\frac{1}{N}\sum_{n=0}^{N-1} x(n)e^{\frac{-j2\pi nk}{N}}$
Option C:	$\frac{1}{N}\sum_{n=0}^{N+1} x(n)e^{\frac{j2\pi nk}{N}}$
Option D:	$\frac{1}{N}\sum_{n=0}^{N+1} x(n)e^{\frac{-j2\pi nk}{N}}$
19.	The discrete time signal $a^n.u(n)$ will have alternate positive and negative amplitudes decaying with time for following case.
Option A:	-1<a<0; and n<0
Option B:	-1<a<0; and n>0
Option C:	0<a<1; and n<0
Option D:	0<a<1; and n>0
20.	The Fourier transform of the signal sgn(t) is _____
Option A:	−2jω
Option B:	4jω
Option C:	2/(jω)
Option D:	(1+ jω)

Q2.	**(20 Marks)**
A	**Solve any Two** **5 marks each**
i.	Determine the power and energy of the following continuous time signal $x(t)= e^{-at} u(t)$
ii.	Check for the Dynamicity, Linearity, Shift Variant ,Causality and Stability $y(t) = x(2t)$
iii.	Obtain the Fourier transforms and spectrums of the signal $x(t) = \cos w_o t$
B	**Solve any One** **10 marks each**
i.	Find the inverse Laplace transform of the function $X(S) = \frac{3s+7}{(s^2-2S-3)}$ For ROCs of i) Re (s) > 3 ii) Re (s) < -1 iii) -1 < Re (s) < 3
ii.	Perform the convolution of $x_1(t) = e^{-3t} u(t)$ and $x_2(t) = t\, u(t)$ Using

	mathematical method and also by graphical method.

Q3.	**(20 Marks)**
A	**Solve any Two** **5 marks each**
i.	Find the DTFT of discrete time signal $x(n) = a^n u(n)$ for $-1 < a < 1$.
ii.	Determine the z-transform of $x(n) = (1/2)^n u(n) + 2^n u(n)$. Find the ROC and draw the locations of poles and zeros in the z-plane.
iii.	Write the relationship between z-transform and discrete time fourier transform.
B	**Solve any One** **10 marks each**
i.	Find the inverse z- transform of $X(Z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$ For ROCs of i) ROC: $\lvert(Z)\rvert > 1$ ii) ROC: $\lvert(Z)\rvert < 0.5$ iii) ROC: $0.5 < \lvert(Z)\rvert < 1$
ii.	Determine DTFS for the sequence $x(n) = 4 \cos(\frac{\pi n}{2})$

University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from June 01, 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016 (CBCGS)

Examination: TE Semester VI

Course Code: **ELXDLO6023** and Course Name: **Wireless 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.	What must be designed to separate the transmit & receive signal at mobile subscriber unit.
Option A:	Antenna
Option B:	Duplexer
Option C:	Transceiver
Option D:	Control Unit
2.	Formulate the system capacity, if a mobile communication system has allocated number of 800 voice channels. If the service area is divided into 20 cells with a frequency reuse factor of 4.
Option A:	800
Option B:	3200
Option C:	4000
Option D:	16000
3.	For a given frequency reuse ratio of 8 and the cell radius of 0.8 km, the distance between nearest cochannel cells is
Option A:	6.4 km
Option B:	0.8 km
Option C:	0.1 km
Option D:	8.8 km
4.	To examine the measure of the ability of a mobile subscriber to access a cellular system during the busiest hour is------
Option A:	circuit merit level
Option B:	mean opinion score
Option C:	grade of service
Option D:	service quality
5.	Two main reasons that contribute to the rapid fluctuations of the signal amplitudein mobile communications are
Option A:	Multipath fading and Doppler effect
Option B:	Reflection and Refraction
Option C:	Diffraction and Scattering
Option D:	Blocking and Shadowing

6.	In the development of base station transmitter operates at 900 MHz carrier frequency. For a mobile moving at a speed of 72 Km/h in a direction perpendicular to the direction of arrival of the transmitted signal, the received carrier frequency is
Option A:	899.99994 MHz
Option B:	900.00006 MHz
Option C:	900.00003 MHz
Option D:	900 MHz
7.	When 2 mobile subscribers are located at distance of 100 meters & 1 km apart from cell site resp. then by what amount the received signal strength differs? (assuming other parameters are constant).
Option A:	20 dB
Option B:	40 dB
Option C:	80 dB
Option D:	100 dB
8.	The guard time between the time slots in TDMA frame helps in minimizing the interference due to__along different radio paths in the wireless channel.
Option A:	propagation delays
Option B:	adjacent channel
Option C:	multipath fading
Option D:	timing inaccuracies
9.	To synthesize the increment in bandwidth of message signa, the deciding factor is
Option A:	PN Sequence
Option B:	Gold sequence
Option C:	Spread spectrum
Option D:	Processing gain
10.	X-OR addition of 2 m sequence PN generators is nothing but
Option A:	propagation delay generator
Option B:	spectrum modulation
Option C:	golden ration generator
Option D:	gold sequence generator
11.	To organize high spectrum efficiency and constant amplitude in GSM, the modulation technique used is ------
Option A:	FSK
Option B:	QPSK
Option C:	GMSK
Option D:	OFDM
12.	To facilitate the identity of mobile phone device, the MSC uses the database as ---
Option A:	HLR

Option B:	VLR
Option C:	AuC
Option D:	EIR
13.	Considering Coded data packets in GSM, compute the net data rate (data plus signaling) and the effective transmission rate of a 9,600 bps GSM data service.
Option A:	9600 bps
Option B:	22.8 kbps
Option C:	33.854 kbps
Option D:	13 kbps
14.	If the trailing bits, stealing bits, guard bits, and training bits in a GSM frame are considered as overhead, and the rest of the bits as data, then what is the percentage overhead in a GSM frame?
Option A:	57.14 %
Option B:	70.166 %
Option C:	91 %
Option D:	27 %
15.	To illustrate the user occupying (a single) time slot has to wait for time duration of between two successive transmissions
Option A:	577 µs
Option B:	4.615 ms
Option C:	120 ms
Option D:	6.12 s
16.	While design, the effect of spread spectrum modulation is that the bandwidth of the spreaded signal _____.
Option A:	remains constant
Option B:	increases significantly
Option C:	increases marginally
Option D:	decreases
17.	How much bandwidth is occupied in selection of each carrier of IS-95 standard
Option A:	25 KHz
Option B:	30 KHz
Option C:	200 KHz
Option D:	1250KHz
18.	Cdma2000-1xRTT system supports a typical throughput of up to _____ per mobile user.
Option A:	115kbps
Option B:	144 kbps
Option C:	384 kbps
Option D:	2 mbps
19.	In closed loop power control, the base station sends power control messages to the mobile user about once every

Option A:	1 ms
Option B:	10 ms
Option C:	100 ms
Option D:	1 s
20.	The logical control channel specified on the reverse link in W-CDMA system is which channel?
Option A:	Sync
Option B:	Access
Option C:	Paging
Option D:	pilot

Q2	
A	**Solve any Two** **5 marks each**
i.	Distinguish between frequency division duplexing & time division duplexing
ii.	Describe various factors influencing small scale fading
iii.	Discuss in brief about TDMA frame structure & Efficiency of TDMA.
B	**Solve any One** **10 marks each**
i.	Explain GSM Network architecture with neat block diagram. Compute the longest time over which a mobile station would have to wait in order to determine the frame number being transmitted by GSM cell-site.
ii.	Illustrate the function of GPRS architecture in brief. **A** CDMA system has a bandwidth of 1.25 MHz and transmits baseband data at 9.6 kbps rate. If 40 number of users can simultaneously establish communication links, what is the bandwidth efficiency of the system?

Q3	
A	**Solve any Two** **5 marks each**
i.	Describe the concept of frequency reuse, define cluster.
ii.	Explain the types of small-scale fading.
iii.	Discuss about direct sequence spread spectrum transmitter & receiver with neat block diagram.
B	**Solve any One** **10 marks each**
i.	Explain hand off in GSM, Illustrate types of GSM hand off in GSM. If the trailing bits, stealing bits, guard bits, and training bits in a GSM frame are considered as overhead, and the rest of the bits as data, then what is the percentage overhead in a GSM frame?
ii.	Distinguish between W-CDMA and IS-95 CDMA. Determine the maximum raw instantaneous data rate that can be provided to a single user in EDGE, assuming that a single time slot on a single GSM channel is available.

University of Mumbai
Examination 2021 under Cluster 06
(Lead College: Vidyavardhini's College of Engg Tech)
Examinations Commencing from June 01, 2021
Program: **Electronics Engineering**
Curriculum Scheme: Rev 2016
Examination: TE Semester VI
Course Code: ELXDLO6024 and Course Name: Computer Organization and Architecture
Time: 2 hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following Special purpose register holds the address of next instructions to be executed?
Option A:	Program Counter
Option B:	Instruction Register
Option C:	MAR
Option D:	Base Register
2.	Booth's Multiplier
Option A:	reduces the number of partial products
Option B:	increases the number of partial products
Option C:	multiplies the number of partial products
Option D:	divides the partial products
3.	Bias value for single precision and double precision representation is …… & …….
Option A:	128, 1024
Option B:	127 , 1023
Option C:	256, 512
Option D:	32, 64
4.	A set of microinstructions for a single machine instruction is called ….
Option A:	Program
Option B:	Command
Option C:	Micro program
Option D:	Micro command
5.	Full form of MFLOPS is _____
Option A:	Millions of Fixed Point Operations Per Second
Option B:	Millions of Floating Point Operations Per Second
Option C:	Millions of Floating Point Opcodes Per Second
Option D:	Millions of Flip/Flops Operations Per Second
6.	A micro-programmed control unit
Option A:	faster than a hard-wired control unit
Option B:	facilitates easy implementation of new instructions
Option C:	useful when very small programs are to be run
Option D:	usually refers to the control unit of microprocessor.
7.	How many 128 X 8 RAM chips are needed to provide a memory capacity of 2048 bytes?
Option A:	8
Option B:	16

Option C:	2
Option D:	4
8.	Which of the following is not a write policy to avoid Cache Coherence?
Option A:	Write through
Option B:	Write within
Option C:	Write back
Option D:	Buffered write
9.	Which algorithm chooses the page that has not been used for the longest period of time whenever the page required to be replaced?
Option A:	First in first out algorithm
Option B:	Additional reference bit algorithm
Option C:	Least recently used algorithm
Option D:	Counting based page replacement algorithm
10.	What are the five main components of a computer system
Option A:	CPU,CD-ROM, Mouse, Keyboard, Sound Card
Option B:	Memory ,Video card, Monitor, Software, Hardware
Option C:	Modem, Keyboard, Word Processor , Printer, Screen
Option D:	CPU, Memory ,System bus ,Input, Output
11.	Cache memory works on the principle of ……..
Option A:	Locality of Memory
Option B:	Locality of reference
Option C:	Locality of data
Option D:	Locality of reference and memory
12.	Hidden bus arbitration is feature of …….
Option A:	MOD BUS
Option B:	CAN BUS
Option C:	PCI BUS
Option D:	ISA BUS
13.	SIMD stands for ……
Option A:	Single information Multiple Design
Option B:	Single Instruction Multiple Data
Option C:	Single Instructions Multiple Design
Option D:	Single Information Multiple document
14.	Which of the following processor has a fixed length of instructions?
Option A:	CISC
Option B:	RISC
Option C:	EPIC
Option D:	Multi core
15.	The concept of pipelining is most effective performance if the tasks being performed in different stages ….
Option A:	Require different amount of time
Option B:	Require about the same amount of time
Option C:	Require different amount of time with time difference between any two tasks being same
Option D:	Require different amount with time difference between any two tasks being different
16.	The set of loosely connected computers are called as _____
Option A:	LAN

Option B:	WAN
Option C:	Workstation
Option D:	Cluster
17.	An instruction pipeline can be implemented by means of ……
Option A:	LIFO Buffer
Option B:	FIFO Buffer
Option C:	Stack
Option D:	Both LIFO Buffer and FIFO Buffer
18.	The Unit of data Exchange between Cache and Main Memory is known as
Option A:	Cache size
Option B:	Block size
Option C:	Page size
Option D:	Segment size
19.	Hazards due to resource conflict are called as …
Option A:	Data Hazard
Option B:	Control Hazard
Option C:	Structural Hazard
Option D:	Both Data Hazard and Control Hazard
20.	The following sequence of virtual page numbers is encountered in the course of execution on a computer with virtual memory:3 4 2 6 4 7 1 3 2 6 3 5 1 2 3 Assume that a least recently used page replacement policy. Find out the Page Hit Ratio with main memory with Page capacity n = 4. Assume that main memory is initially empty.
Option A:	0.22
Option B:	0.10
Option C:	0.20
Option D:	0.16

Q2 (20 Marks)	
A	**Solve any Two 5 marks each**
i.	Draw and explain instruction state diagram(without interrupt).
ii.	Explain different write policy methods.
iii.	Explain SRAM structure and working.
B	**Solve any One** **10 marks each**
i.	Discuss system buses in detail. Highlight PCI bus and its operation in detail.
ii.	Discuss Hardwired and Micro-programmed Control unit in detail.
Q3 (20 Marks)	
A	**Solve any Two out of three** **5 marks each**
i.	Write short notes on GPU.
ii.	Discuss paging concept in short.
iii.	Discuss I/O handling techniques. (any two techniques)
B	**Solve any One out of two** **10 marks each**
i.	Discuss parallel processing and pipelining in detail.
ii.	Explain Flynn's classification in detail with suitable diagrams.