University of Mumbai

Examination 2021 under cluster __ (Lead College: _____)

Examinations Commencing from 1st June 2021 to 10th June 2021

Program: **BE (Information Technology)**

Curriculum Scheme: Rev2016

Examination: SE Semester: IV

Course Code: ITC401 and Course Name: Applied Mathematics-IV

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.	Find the Greatest Common Divisor of 666 and 1414 by using Euclidean Algorithm.
Option A:	3
Option B:	1
Option C:	4
Option D:	2
2.	Integral solution of the equation $-63x + 23y = 7$ is
Option A:	$x = -4 \ \& \ y = -11$
Option B:	$x = 4 \ \& \ y = -11$
Option C:	$x = 4 \ \& \ y = 11$
Option D:	$x = -4 \ \& \ y = 11$
3.	From the following numbers, which number is a prime number?
Option A:	2737
Option B:	7293
Option C:	299
Option D:	509
4.	The remainder when 5 divides $(56)^{111}$ is _____
Option A:	2
Option B:	1
Option C:	0
Option D:	4
5.	Find x if $5^{19} \equiv x \ (mod\ 19)$
Option A:	17
Option B:	12
Option C:	5
Option D:	15
6.	If $7x \equiv 3 (mod\ 5)$ then $x =$ ____
Option A:	1
Option B:	2
Option C:	4

Option D:	3
7.	Find value of Jacobi's symbol $\left(\frac{105}{1009}\right)$
Option A:	-1
Option B:	0
Option C:	-2
Option D:	1
8.	The Probability density function of a random variable X is X | 1 | 2 | 3 | 4 | 5 P(X=x) | k | 3k | 5k | 7k | 9k Find P$(2 < X < 5)$
Option A:	$\frac{12}{25}$
Option B:	$\frac{13}{25}$
Option C:	$\frac{14}{25}$
Option D:	$\frac{15}{25}$
9.	A continuous random variable has probability density function $f(x) = x - x^2; 0 \leq x \leq 1$. Find Mean
Option A:	$\frac{1}{12}$
Option B:	$\frac{1}{3}$
Option C:	$\frac{1}{6}$
Option D:	$\frac{5}{3}$
10.	The Moment Generating Function about origin of a random variable is $M_0(t) = \frac{3}{3-t}$. Find first moment about origin.
Option A:	$\frac{2}{3}$

<table>
<tr><td>Option B:</td><td>$\frac{1}{3}$</td></tr>
<tr><td>Option C:</td><td>$\frac{5}{9}$</td></tr>
<tr><td>Option D:</td><td>$\frac{4}{3}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>11.</td><td>If a random variable X follows Poisson distribution such that $P(X = 1) = 2P(X = 2)$ then find the value of $P(X = 4)$</td></tr>
<tr><td>Option A:</td><td>0.03754</td></tr>
<tr><td>Option B:</td><td>0.01532</td></tr>
<tr><td>Option C:</td><td>0.04945</td></tr>
<tr><td>Option D:</td><td>0.02879</td></tr>
<tr><td></td><td></td></tr>
<tr><td>12.</td><td>If a sample point lies in the critical region then</td></tr>
<tr><td>Option A:</td><td>Null Hypothesis is Accepted and Alternate Hypothesis is Rejected</td></tr>
<tr><td>Option B:</td><td>Null Hypothesis is Rejected and Alternate Hypothesis is Accepted</td></tr>
<tr><td>Option C:</td><td>Both Null Hypothesis and Alternate Hypothesis are Accepted</td></tr>
<tr><td>Option D:</td><td>Both Null Hypothesis and Alternate Hypothesis are Rejected</td></tr>
<tr><td></td><td></td></tr>
<tr><td>13.</td><td>The correlation coefficient $r$for the following data is
<table>
<tr><td>X</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr>
<tr><td>Y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr>
</table></td></tr>
<tr><td>Option A:</td><td>0.372</td></tr>
<tr><td>Option B:</td><td>0.6030</td></tr>
<tr><td>Option C:</td><td>0.574</td></tr>
<tr><td>Option D:</td><td>-0.493</td></tr>
<tr><td></td><td></td></tr>
<tr><td>14.</td><td>The equations of the two regression lines are $x + 6y = 6$ & $3x + 2y = 10$. Find the correlation coefficient r.</td></tr>
<tr><td>Option A:</td><td>$\frac{1}{3}$</td></tr>
<tr><td>Option B:</td><td>$\frac{2}{3}$</td></tr>
<tr><td>Option C:</td><td>$-\frac{1}{3}$</td></tr>
<tr><td>Option D:</td><td>$-\frac{2}{3}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>15.</td><td>A connected planar graph has 9 vertices having vertices 2, 2, 2, 3, 3, 3, 4, 4 and 5. How many edges are there in the graph?</td></tr>
</table>

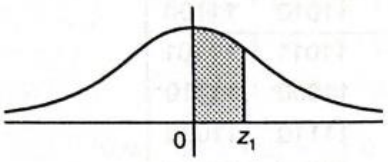
Option A:	12
Option B:	13
Option C:	14
Option D:	15
16.	A tree T has $2n$ vertices of degree 1, $3n$ vertices of degree 2 and n vertices of degree 3. Determine the number of vertices in the tree T.
Option A:	8
Option B:	10
Option C:	12
Option D:	14
17.	Given that G be the set of real numbers is a Group under operation $a * b = a + b - 2$. Find the identity element of the group.
Option A:	0
Option B:	1
Option C:	-2
Option D:	2
18.	Given that $A = \{1, 2, 3, 4, 5, 6\}$ is a finite abelian group under multiplication modulo 7. Find $(5)^{-1}$ under multiplication modulo 7.
Option A:	2
Option B:	3
Option C:	5
Option D:	6
19.	Given that $A = \{1, 2, 5, 7, 10, 14, 35, 70\}$ is a lattice under the relation divisibility. Find $5 \wedge 14$.
Option A:	5
Option B:	10
Option C:	14
Option D:	1
20.	Given that $L = \{2, 6, 8, 12, 24\}$ is a Lattice under the relation divisibility. Find complement of the element 6.
Option A:	8
Option B:	2
Option C:	12
Option D:	24

Q2	**Solve any Four out of Six** **5 marks each**
A	Find all integral solutions of the Diophantine Equation $51x + 111y = 6$ by using Euclidean Algorithm.
B	Solve the following simultaneous congruences $x \equiv 1(mod\ 5), \quad x \equiv 2(mod\ 6), \quad x \equiv 3(mod\ 7)$
C	The probability that a bomb dropped from a plane will strike the target is 1/5. If 6 such bombs are dropped, find the probability that (i) exactly two bombs hit the target (ii) at least two bombs will hit the target
D	Can it be concluded that the average life span of an Indian is more than 70 years, if a random sample of 100 Indians has an average life span of 71.8 years with standard deviation of 8.9 years?
E	A tree *T*has some vertices of degree one, two vertices of degree two, three vertices of degree four and four vertices of degree three. Find the number of vertices of degree one in the tree.
F	Prove that $A = \{1, 3, 5, 15, 30, 60, 90, 180\}$ is Lattice under the relation divisibility.

Q3	**Solve any Four out of Six** **5 marks each**
A	Prove that 7 divides $111^{333} + 333^{111}$
B	Find value of Jacobi's symbol $\left(\frac{2657}{9897}\right)$
C	In an intelligence test administered to 1000 students, the average was 42 and standard deviation was 24. Find the number of students (i) exceeding the score 50 and (ii) between 30 and 54.
D	Calculate Spearman's coefficient of rank correlation from the following data. X 10 12 18 18 15 40 Y 12 18 25 25 50 25
E	Prove that $A = \{0, 1, 2, 3, 4, 5\}$ is a finite abelian group under addition modulo 6.

F	Prove that $L = \{1,\ 2,\ 3,\ 6\}$ is a complemented Lattice under the relation divisibility.

Area Under Standard Normal Curve



The table gives the area under the standard normal curve from $z = 0$ to $z = z_1$ which is the probability that z will lie between $z = 0$ and $z = z_1$.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.09 10	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2703	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4415	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4841	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4560	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev2016

Examination: BE Semester IV

Course Code:ITC402 and Course Name: Computer Networks

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.	The Go-Back-N Sliding window Protocol uses 3-bit sequence number to assign numbers to the frames. Then Size of Sender window and Size of Receiver window is
Option A:	Sender Window size=7 , Receiver Window Size 1
Option B:	Sender Window size=3 , Receiver Window Size 3
Option C:	Sender Window size=1 , Receiver Window Size 1
Option D:	Sender Window size=8 , Receiver Window Size 1
2.	A bit string, 011111111100 , needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing?
Option A:	0111111111100
Option B:	0111110111100
Option C:	0011111011110
Option D:	011110011111
3.	Which Carrier Sense Multiple Access protocol is used in Ethernet LANs?
Option A:	CSMA
Option B:	CSMA/CD
Option C:	CSMA/CA
Option D:	CSMA/CTS
4.	Ethernet frame contains
Option A:	Port address
Option B:	Logical Address
Option C:	Physical Address
Option D:	Socket Address
5.	Identify the transmission media of Wireless Local Area Network?
Option A:	Guided
Option B:	Unguided
Option C:	Connection-less
Option D:	Connection oriented
6.	FHSS is
Option A:	Modulation Technique
Option B:	Multiplexing technique
Option C:	Encoding technique
Option D:	Decoding Technique
7.	You have an IP address of 172.16.13.5 with a 255.255.255.128 subnet mask. What is your class of address and subnet address and bits used for subnetting?

Option A:	Class A, Subnet 172.16.13.0, 1 bit for subnetting
Option B:	Class B, Subnet 172.16.13.0, 9 bits for subnetting
Option C:	Class B, Subnet 172.16.0.0, 9 bits for subnetting
Option D:	Class B, Subnet 172.16.0.0, 1 bit for subnetting
8.	If the destination address of the received packet is 210.53.123.145 and netmask is 255.255.224.0 Find network address
Option A:	210.53.96.0
Option B:	210.53.123.0
Option C:	210.53.128.0
Option D:	None of These
9.	In OSPF header, which field is used to detect errors in the packet?
Option A:	Type
Option B:	Area ID
Option C:	Authentication type
Option D:	Checksum
10.	In open-loop control, policies are applied to _____
Option A:	Remove after congestion occurs
Option B:	Remove after sometime
Option C:	Prevent before congestion occurs
Option D:	Prevent before sending packets
11.	A subset of a network that includes all the routers but contains no loops is called
Option A:	Spanning tree
Option B:	Spider structure
Option C:	Spider tree
Option D:	Special tree
12.	An endpoint of an inter-process communication flow across a computer network is called _____
Option A:	pipe
Option B:	socket
Option C:	port
Option D:	machine
13.	What is the main advantage of UDP?
Option A:	More overload
Option B:	Reliable
Option C:	Low overhead
Option D:	Fast
14.	The client in socket programming must know which information?
Option A:	IP address of Server
Option B:	Port number
Option C:	Only its own IP address
Option D:	Both IP address of Server & Port number
15.	Backpressure technique can be applied only to _____
Option A:	Congestion networks
Option B:	Closed circuit networks
Option C:	Open circuit networks
Option D:	Virtual circuit networks

16.	In TCP/IP protocol as the information moves from lower to higher layer headers are ....
Option A:	Added
Option B:	Removed
Option C:	Merged
Option D:	Checked and added
17.	In simplex transmission, data flows in ....
Option A:	both direction
Option B:	in one direction
Option C:	both direction but not simultaneously
Option D:	both direction and simultaneously
18.	..... protocol is used to assign IP address in the network
Option A:	SMTP
Option B:	HTTP
Option C:	DHCP
Option D:	RIP
19.	DNS system is..... system
Option A:	Centralized
Option B:	Distributed
Option C:	Peer to Peer
Option D:	Hybrid
20.	Transport Layer offers ..... services
Option A:	Point to point
Option B:	End to end
Option C:	Process to process
Option D:	Both P2P and E2E

Q2. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	What are the limitations of OSI model?
ii.	Compare Lossless vs.Lossy compression techniques.
iii.	Consider an error detecting CRC with the generator G(x) =10011 Compute the transmitted bit sequence For the data bit sequence 1101011011.
B	**Solve any One** **10 marks each**
i.	Explain LSR routing algorithm and mention how it overcomes drawbacks of DVR?
ii.	Is slotted ALOHA performance is better than pure aloha? Justify your answer.

Q3. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Write short note on -Framing methods
ii.	Which cable you will use to connect the machines to form a Local area network of an educational organization and Why?
iii.	Explain subnetting with example
B	**Solve any One** **10 marks each**
i.	How TCP controls the Congestion, explain in detail
ii.	Explain HDLC Protocol

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: **Rev2016**

Examination: BE Semester IV

Course Code: **ITC403** and Course Name: **OPERATING 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.	In a programmed input/output(PIO) _____
Option A:	the CPU uses polling to watch the control bit constantly, looping to see if a device is ready
Option B:	the CPU writes one data byte to the data register and sets a bit in control register to show that a byte is available
Option C:	the CPU receives an interrupt when the device is ready for the next byte
Option D:	the CPU runs a user written code and does accordingly
2.	Two processes often require data to be transferred between them. The major activities of an operating system with respect to?
Option A:	Error handling
Option B:	Resource Management
Option C:	Protection
Option D:	Communication
3.	Which one of the following is not an attack, but a search for vulnerabilities to attack?
Option A:	denial of service
Option B:	port scanning
Option C:	memory access violation
Option D:	dumpster diving
4.	What is the mounting of file system?
Option A:	crating of a filesystem
Option B:	deleting a filesystem
Option C:	attaching portion of the file system into a directory structure
Option D:	removing the portion of the file system into a directory structure
5.	The time taken for the desired sector to rotate to the disk head is called _____
Option A:	positioning time
Option B:	random access time
Option C:	seek time
Option D:	rotational latency

6.	RAID stands for _____
Option A:	Redundant Allocation of Inexpensive Disks
Option B:	Redundant Array of Important Disks
Option C:	Redundant Allocation of Independent Disks
Option D:	Redundant Array of Independent Disks
7.	A server crash and recovery will _____ to a client.
Option A:	be visible
Option B:	Affect
Option C:	be invisible
Option D:	Harm
8.	Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called?
Option A:	Fragmentation
Option B:	Paging
Option C:	Mapping
Option D:	Segmentation
9.	The operating system and the other processes are protected from being modified by an already running process because _____
Option A:	they are in different memory spaces
Option B:	they are in different logical addresses
Option C:	they have a protection algorithm
Option D:	every address generated by the CPU is being checked against the relocation and limit registers
10.	The _____ is used as an index into the page table.
Option A:	frame bit
Option B:	page number
Option C:	page offset
Option D:	frame offset
11.	Each entry in a translation lookaside buffer (TLB) consists of _____
Option A:	Key
Option B:	Value
Option C:	bit value
Option D:	Constant
12.	A multilevel page table is preferred in comparison to a single level page table for translating virtual address to physical address because _____
Option A:	it reduces the memory access time to read or write a memory location
Option B:	it helps to reduce the size of page table needed to implement the virtual address space of a process
Option C:	it is required by the translation lookaside buffer
Option D:	it helps to reduce the number of page faults in page replacement algorithms
13.	Which technique is based on compile-time program transformation for accessing remote data in a distributed-memory parallel system?
Option A:	cache coherence scheme

Option B:	computation migration
Option C:	remote procedure call
Option D:	message passing
14.	Implementation of a stateless file server must not follow?
Option A:	Idempotency requirement
Option B:	Encryption of keys
Option C:	File locking mechanism
Option D:	Cache consistency
15.	A semaphore S is an integer variable that, apart from initialization, is accessed only through two standard atomic operations:
Option A:	Exec() & exit()
Option B:	Exec() & signal()
Option C:	Wait() & signal()
Option D:	Wait() & exit()
16.	After fork() system call, one of the two processes typically uses the _____ system call to replace the process's memory space with a new program.
Option A:	Exit
Option B:	Init
Option C:	Wait
Option D:	Exec
17.	Copying a process from memory to disk to allow space for other processes is called
Option A:	Swapping
Option B:	Deadlock
Option C:	Demand paging
Option D:	Page fault
18.	For long-term scheduler which of the following stand TRUE i. The long term scheduler executes much less frequently. ii. Because of the longer interval between executions, the long-term scheduler can afford to take more time to decide which process should be selected for execution. iii. Because of the smaller interval between executions, the long-term scheduler can afford to take less time to decide which process should be selected for execution. iv. The long-term scheduler executes more frequently.
Option A:	i, ii only
Option B:	i only
Option C:	i & iv only
Option D:	i, Ii & iii only
19.	Kernel threads
Option A:	Cannot be supported & managed directly by the OS.
Option B:	Can be supported & managed directly by the OS.
Option C:	Are managed below the kernel & are managed without kernel support
Option D:	Are managed above the kernel & are managed with kernel support

20.	Which of the following Multithreading model maps many user-level threads to one kernel thread.
Option A:	Many to One Model
Option B:	One to Many Model
Option C:	Many to Many Model
Option D:	One to One Model

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	What are the major activities of an operating system with regards to file management and memory management?
B	What is paging? How it is different from segmentation? Explain Hardware support for paging.
C	Explain methods for deadlock handling.

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Explain RAID Level in Details
B	Compare Sate full Server v/s Stateless Server with a proper example.
C	Consider the following set of processes, with the length of CPU burst given in mili seconds. The processes are assumed to have arrived order P1, P2, P3. Calculate the average turnaround time and average waiting time for FCFS & SJF algorithm. Also draw Gantt Chart.

PROCESS	BURST TIME	ARRIVAL TIME
P1	15	0
P2	5	0
P3	13	0

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev2016

Examination: BE Semester IV

Course Code: ITC404 Course Name: Computer Organization and Architecture

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.	What is the function of MAR?
Option A:	Read/write a word from memory
Option B:	Specify an address of memory
Option C:	Contains the 8-bit op-code
Option D:	Store address of next instruction
2.	The functions of Pins from 24 to 31depend on the mode in which _____ is operating.
Option A:	8085
Option B:	80835
Option C:	80845
Option D:	8086
3.	The bus used to connect the monitor to the CPU is _____.
Option A:	PCI Bus
Option B:	SCSI Bus
Option C:	Memory Bus
Option D:	RAM Bus
4.	Which segment register is being used in the given instruction? MOV CX, SS: [BX]
Option A:	Extra Segment Register (ES)
Option B:	Code Segment Register (CS)
Option C:	Stack Segment Register (SS)
Option D:	Data Segment Register (DS)
5.	The instructions that are used for reading an input port and writing an output port respectively are_____.
Option A:	MOV, XCHG
Option B:	MOV, IN
Option C:	IN, MOV
Option D:	IN, OUT

6.	The instruction that loads the effective address formed by destination operand into the specified source register is_____.
Option A:	LEA
Option B:	LDS
Option C:	LES
Option D:	LAHF
7.	When large delays are required, then _____.
Option A:	one or more count registers can be used
Option B:	one or more shift registers can be used
Option C:	one or more pointer registers can be used
Option D:	one or more index registers can be used
8.	A micro-programmed control unit _____.
Option A:	is faster than a hard-wired control unit
Option B:	facilitates easy implementation of new instructions
Option C:	is useful when very small programs are to be run
Option D:	Usually refers to the control unit of microprocessor
9.	Which category includes traditional uniprocessors?
Option A:	SISD
Option B:	SIMD
Option C:	MISD
Option D:	MIMD
10.	To increase the speed of memory access in pipelining, we make use of _____.
Option A:	Special Memory locations
Option B:	Special Purpose registers
Option C:	Cache
Option D:	Buffers
11.	The ability to shift or rotate in the same instruction along with other operations is performed with the help of _____.
Option A:	Switching circuit
Option B:	Barrel switcher circuit
Option C:	Integrated Switching circuit
Option D:	Multiplexer circuit
12.	In IEEE 32-bit representations, the mantissa of the fraction is said to occupy _____ bits.
Option A:	23
Option B:	24
Option C:	20
Option D:	16
13.	Which of the following is used for binary multiplication?
Option A:	Restoring Multiplication
Option B:	Booth's Algorithm
Option C:	Pascal's Rule
Option D:	Digital-by-Digital Multiplication

14.	2’s complement of 11001011 is _____.
Option A:	01010111
Option B:	11010100
Option C:	00110101
Option D:	11100010
15.	In restoring division algorithm, for Dividend=10000 and Divisor=100. How many numbers of cycles are required to get the correct division result?
Option A:	4
Option B:	5
Option C:	3
Option D:	6
16.	The fastest data access is provided using_____.
Option A:	Cache
Option B:	DRAM's
Option C:	SRAM's
Option D:	Registers
17.	The last on the hierarchy scale of memory devices is _____.
Option A:	Main Memory
Option B:	Secondary Memory
Option C:	TLB
Option D:	Flash drives
18.	Memory unit accessed by content is called_____.
Option A:	Read only memory
Option B:	Programmable Memory
Option C:	Virtual Memory
Option D:	Associative Memory
19.	In memory-mapped I/O _____.
Option A:	The I/O devices and the memory share the same address space
Option B:	The I/O devices have a separate address space
Option C:	The memory and I/O devices have an associated address space
Option D:	A part of the memory is specifically set aside for the I/O operation
20.	I/O Interrupt driven is more efficient than_____.
Option A:	I/O Modules
Option B:	I/O Devices
Option C:	Programmed I/O
Option D:	CPU

Q2 **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	Draw block diagram of maximum mode operation of 8086.
B	Write a program to add two 16-bit numbers where the numbers are at 5000 and 5002 memory address and store result into 5004 and 5006 memory address.
C	Explain concepts of Nano programming.
D	Draw the flowchart of the Restoring Division algorithm.
E	What is Associative memory?
F	What are the major functions of an I/O module?
Q3 **(20 Marks Each)**	**Solve any Two out of Three** **10 marks each**
A	Multiply (-5) and (2) using Booth's algorithm.
B	What is addressing mode? Explain addressing modes of 8086 with examples.
C	List the Flynn's classification of Parallel Processing System and describe each classification in detail.

University of Mumbai
Examination June 2021
Examinations Commencing from 1st June 2021
Program: **Information Technology**
Curriculum Scheme: Rev2016
Examination: BE Semester IV
Course Code: ITC405 and Course Name: Automata Theory
Time: 2 hour Max. Marks: 80
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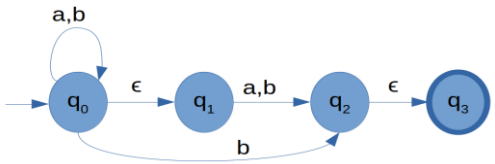
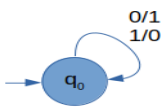
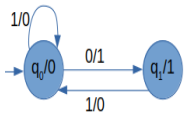
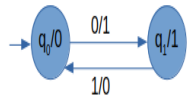
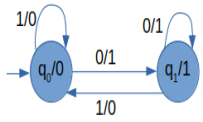
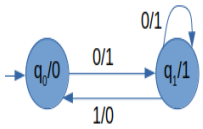
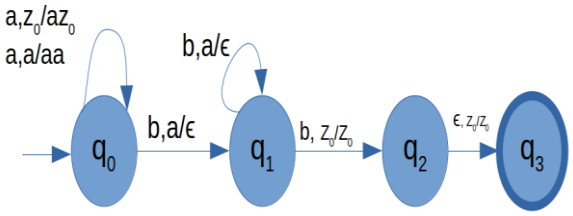
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Recursively enumerable problems can be solved using _____
Option A:	Linear Bounded Automata
Option B:	Pushdown Automata
Option C:	Turing Machine
Option D:	Finite Automata
2.	Which of the following answers represent method/s of acceptance by a PDA
Option A:	Empty stack method, By reaching Final state
Option B:	Only Empty stack method
Option C:	Only by reaching final state
Option D:	PDA can accept input by having a specific state of stack contents.
3.	Consider NFA with epsilon moves shown in the transition diagram. Consider the device is in state 0 and input is symbol 'a'; which of the following options represents the states the device can reach if it takes this transition ? 
Option A:	{q0 , q2}
Option B:	{q0 , q1 , q2}
Option C:	{q0 , q1 , q2 , q3}
Option D:	{q0 , q1}
4.	Syntax analysis in the compiler is possible with which of the following machine.
Option A:	Mealy Machine
Option B:	Moore Machine
Option C:	Pushdown Automata
Option D:	Turing Machine
5.	Relate the following statement:

	Statement: All sufficiently long words in a regular language can have a middle section of words repeated a number of times to produce a new word which also lies within the same language.
Option A:	Turing Machine
Option B:	Pumping Lemma
Option C:	Arden's theorem
Option D:	Push Down Automata
6.	Which automaton accepts Type-2 grammar?
Option A:	Turing Machine
Option B:	PDA
Option C:	DFA
Option D:	NFA
7.	Select the correct option from below about the pair of states in FA.
Option A:	If a pair of states (q_i, q_j) is a pair of equivalent states of a FA then one of them must be final and the other must be a non final state.
Option B:	If a pair of states (q_i, q_j) is a pair of distinct states of a FA then both must be non-final.
Option C:	If a pair of states (q_i, q_j) is a pair of distinct states of a FA then both must be final.
Option D:	If a pair of states (q_i, q_j) is a pair of equivalent states of a FA then they must either be both final or both non-final.
8.	The minimum number of states required in a DFA (along with a dumping state) to check whether the 3rd bit is 1 or not for |n|>=3
Option A:	3
Option B:	4
Option C:	5
Option D:	1
9.	What is the language of the Turing machine?
Option A:	Regular language
Option B:	Context free language
Option C:	Recursive enumerable language
Option D:	Context sensitive language
10.	An NFA accepts a string w given input if _____
Option A:	There is exactly one walk from initial state to final state with label w on the transition graph of NFA.
Option B:	There is at least one walk from initial state to final state with label w on the transition graph of NFA.
Option C:	There is at least one walk from any state to the final state with label w on the transition graph of NFA.

Option D:	There is at most one walk from final state to initial state with label w on the transition graph of NFA.
11.	Which of the following statements is not true?
Option A:	Every language defined by any of the automata is also defined by a regular expression
Option B:	Every language defined by a regular expression can be represented using a PDA
Option C:	Every language defined by a regular expression can be represented using NFA with epsilon moves
Option D:	Regular expression is just another representation for any automata definition
12.	Which of the following statements is true?
Option A:	String ending in 01 over {0,1} can be accepted by desiging FA, PDA as well as TM.
Option B:	We cannot design FA with output to represent binary addition of 2 numbers.
Option C:	Language L of form 0^n1^n for n >=1 can be accepted by a FA.
Option D:	Language L over {0,1} where strings are more than size 4 where the second last symbol is always 1 cannot be accepted by any FA.
13.	The halting problem can tell _____.
Option A:	When the program can halt
Option B:	Whether or not the program will continue to run forever
Option C:	Whether string is accepted or not
Option D:	Whether Turing machine will halt or not
14.	Regular Expression R and the language it describes can be represented as:
Option A:	R, R(L)
Option B:	L(R), R(L)
Option C:	R, L(R)
Option D:	L, R
15.	The FA has to recognize a pattern “word”. How many states are required to recognize the pattern
Option A:	6
Option B:	5
Option C:	3
Option D:	4
16.	Consider the Mealy machine shown in the transition diagram below. Which is the correct option that represents an equivalent Moore machine. 

Option A:	
Option B:	
Option C:	
Option D:	
17.	Consider the following transition diagram for a PDA. Assume Z_0 represents an empty stack symbol. What will be the device state and stack content if partial input given is "aaabbb" 
Option A:	state q_2 Stack content is Z_0
Option B:	state q_2 Stack content is aZ_0
Option C:	state q_1 Stack content is Z_0
Option D:	state q_2 Stack content is ϵ
18.	Regular expression for strings which starts and ends with same letter over ∑={a,b}
Option A:	a(a+b)*a
Option B:	b(a+b)*b
Option C:	(a+b)(a+b)*(a+b)
Option D:	a(a+b)*a+b(a+b)*b
19.	The minimum number of states required by a FA to recognize a decimal number divisible by 4
Option A:	1
Option B:	2
Option C:	3
Option D:	4

20.	Which of the following language cannot be accepted by any deterministic PDA
Option A:	L= {All strings having aba as substring , over Σ={a,b}}
Option B:	L = {w : w is a palindrome over {a, b}* }
Option C:	L = {wdw^r: w string from {a, b}*, w^r is reverse of w and d is different from a and b }
Option D:	L = {a^n b^{m}a^n: n>=1,m>=1}

Q2	
A	**Solve any Two** **5 marks each**
i.	Write down the regular expression for the following language. a) L is a language for all strings over {0,1} having an odd number of 1s and any number of 0s. b) L is language for all strings over {0,1} having number of 10 or 11
ii.	Construct CFG for the languages represented by the following descriptions: a) Alternating sequence of 0 and 1 b) a^{n}b^{m}c^k where k=n+m
iii.	Design a Mealy machine to recognise all inputs over {a,b}* that have aba substring. Device should recognise substring by output 'y' as substring is found.
B	**Solve any One** **10 marks each**
i.	Design a PDA to accept L ={a^n b^{2n}: n>=1}. Clearly define all components of your device. Also show simulation of 1 valid and 1 invalid input string.
ii.	List application of Turing Machine. Design Turing Machine to accept the string of even length.
Q3.	
A	**Solve any Two** **5 marks each**
i.	State and explain closure properties of regular languages.
ii.	Explain power and limitations of regular grammar.
iii.	Design a DFA over {0,1}* starting and ending in 1.
B	**Solve any One** **10 marks each**
i.	Represent (a+b)*(ab+aa)b as NFA epsilon. Convert the same to minimized DFA
ii.	Let G be a grammar. Find Leftmost derivation and rightmost derivation and parse tree for the strings 0012222 and 111222 G: S →0S ǀ 1A ǀ 2B ǀ ϵ A→ 1A ǀ 2B ǀ ϵ B→ 2B ǀ ϵ

University of Mumbai

Examination 2021 under cluster __ (Lead College: _____)

Examinations Commencing from 1st June 2021 to 10th June 2021

Program: B.E.(Information Technology)

Curriculum Scheme: Rev-2019 'C' Scheme

Examination: S.E. Semester IV

Course Code: ITC 401 Course Name: Engineering Mathematics IV

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.	The region of rejection of the null hypothesis H_0 is known as
Option A:	Critical region
Option B:	Favourable region
Option C:	Domain
Option D:	Confidence region
2.	Sample of two types of electric bulbs were tested for length of life and the following data were obtained <table><tr><td></td><td>Size</td><td>Mean</td><td>SD</td></tr><tr><td>Sample 1</td><td>8</td><td>1234 h</td><td>36 h</td></tr><tr><td>Sample 2</td><td>7</td><td>1036 h</td><td>40 h</td></tr></table> The absolute value of test statistic in testing the significance of difference between means is
Option A:	t=10.77
Option B:	t=9.39
Option C:	t=8.5
Option D:	t=6.95
3.	If X is a poisson variate such that $P(X=1)=P(X=2)$, then $P(X=3)$ is
Option A:	$\frac{4e^2}{3}$
Option B:	$4e^2$
Option C:	$\frac{4}{3e^2}$
Option D:	$\frac{4}{e^2}$

4.	If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, Then following is not the eigenvalue ofadj A.
Option A:	6
Option B:	2
Option C:	4
Option D:	3
5.	For the matrix $\begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ the eigenvector corresponding to the distinct eigenvalue $\lambda = 2$ is
Option A:	$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}$
Option C:	$\begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$
Option D:	$\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$
6.	The necessary and sufficient condition for a square matrix to be diagonalizable is that for each of it's eigenvalue
Option A:	algebraic multiplicity > geometric multiplicity
Option B:	algebraic multiplicity = geometric multiplicity
Option C:	algebraic multiplicity < geometric multiplicity
Option D:	algebraic multiplicity ≠ geometric multiplicity
7.	If the characteristic equation of a matrix A of order 3×3 is $\lambda^3 - 7\lambda^2 + 11\lambda - 5 = 0$, then by the Cayley-Hamilton theorem A^{-1} is equal to
Option A:	$\frac{1}{5}(A^3 - 7A^2 + 11\mathrm{A})$
Option B:	$\frac{1}{5}(A^2 + 7A + 11\mathrm{I})$
Option C:	$\frac{1}{5}(A^3 + 7A^2 + 11\mathrm{A})$
Option D:	$\frac{1}{5}(A^2 - 7A + 11\mathrm{I})$
8.	Value of an integral $\int_0^{1+i}(x^2 - iy)dz$ along the path $y = x^2$ is
Option A:	$\frac{5}{6} - \frac{i}{6}$
Option B:	$-\frac{5}{6} - \frac{i}{6}$
Option C:	$\frac{5}{6} + \frac{i}{6}$
Option D:	$\frac{-5}{6} + \frac{i}{6}$

9.	Integral $\int \frac{5z^2+7z+1}{z+1}\, dz$ along a circle $\lvert z\rvert = \frac{1}{2}$is equal to
Option A:	1
Option B:	-1
Option C:	3/2
Option D:	0
10.	Analytic function gets expanded as a Laurent series if the region of convergence is
Option A:	Rectangular
Option B:	Triangular
Option C:	Circular
Option D:	Annular
11.	Residue of $f(z) = \frac{z^2}{(z+1)^2(z-2)}$ at a pole $z = 2$ is
Option A:	4/9
Option B:	2/9
Option C:	1/2
Option D:	0
12.	z-transform of an unit impulse function $\delta(k) = \begin{matrix} 1, & at\ k = 0 \\ 0, & otherwise \end{matrix}$ is
Option A:	1
Option B:	0
Option C:	-1
Option D:	K
13.	$z\{\sin(3k+5)\},\ k \geq 0$ is
Option A:	$\frac{z^2 \sin 2 - z \sin 5}{z^2 - 2z\cos 3 + 1}$
Option B:	$\frac{z^2 \sin 5 + z \sin 2}{z^2 - 2z\cos 3 + 1}$
Option C:	$\frac{z^2 \sin 5 - z \sin 2}{z^2 - 2z\cos 3 + 1}$
Option D:	$\frac{z^2 \sin 2 + z \sin 5}{z^2 - 2z\cos 3 + 1}$
14.	The inverse z-transform of $f(z) = \frac{z}{(z-1)(z-2)}$, $\lvert z\rvert > 2$ is
Option A:	$2^k - 2$
Option B:	$2^k - 1$
Option C:	$2^k + 1$
Option D:	$2^k + 2$
15.	If the basic solution of LPP is $x = 1, y = 0$ then the solution is
Option A:	Feasible and non-Degenerate
Option B:	Non-Feasible and Degenerate
Option C:	Feasible and Degenerate
Option D:	Non-Feasible and non-Degenerate

16.	If the primal LPP has an unbounded solution then the dual has
Option A:	Unbounded solution
Option B:	Bounded solution
Option C:	Feasible solution
Option D:	Infeasible solution
17.	Dual of the following LPP is Maximize $z = 2x_1 + 9x_2 + 11x_3$ $x_1 - x_2 + x_3 \geq 3$ Subject to $-3x_1 + 2x_3 \leq 1$ $2x_1 + x_2 - 5x_3 = 1$ $x_1, x_2, x_3 \geq 0$
Option A:	Minimize $w = -3y_1 + y_2 + y'$ $-y_1 - 3y_2 + 2y' \geq 2$ Subject to $y_1 + y' \geq 9$ $-y_1 + 2y_2 - 5y' \geq 11$ $y_1, y_2 \geq 0$, y' unrestricted
Option B:	Minimize $w = -3y_1 + y_2 + y_3$ $-y_1 - 3y_2 + 2y_3 \geq 2$ Subject to $y_1 + y_3 \geq 9$ $-y_1 + 2y_2 - 5y_3 \geq 11$ $y_1, y_2, y_3 \geq 0$
Option C:	Minimize $w = 2y_1 + 9y_2 + 11y'$ $-y_1 - 3y_2 + 2y' \geq 3$ Subject to $y_1 + y' \geq 1$ $-y_1 + 2y_2 - 5y' \geq 1$ $y_1, y_2 \geq 0$, y' unrestricted
Option D:	Minimize $w = 2y_1 + 9y_2 + 11y_3$ $-y_1 - 3y_2 + 2y_3 \geq 3$ Subject to $y_1 + y_3 \geq 1$ $-y_1 + 2y_2 - 5y_3 \geq 1$ $y_1, y_2 \geq 0$, y' unrestricted
18.	Consider the NLPP: Maximize $z = f(x_1, x_2)$, subject to the constraint $h = g(x_1, x_2) - b \leq 0$. Let $L = f - \lambda g$, then the Kuhn-Tucker conditions are
Option A:	$\frac{\partial L}{\partial x_1} \geq 0, \quad \frac{\partial L}{\partial x_2} \geq 0, \quad \lambda h \geq 0, \quad h \geq 0, \quad \lambda \geq 0$
Option B:	$\frac{\partial L}{\partial x_1} = 0, \quad \frac{\partial L}{\partial x_2} = 0, \quad \lambda h = 0, \quad h \leq 0, \quad \lambda \geq 0$
Option C:	$\frac{\partial L}{\partial x_1} = 0, \quad \frac{\partial L}{\partial x_2} = 0, \quad \lambda h \geq 0, \quad h \leq 0, \quad \lambda \leq 0$
Option D:	$\frac{\partial L}{\partial x_1} \geq 0, \quad \frac{\partial L}{\partial x_2} \geq 0, \quad \lambda h \geq 0, \quad h \geq 0, \quad \lambda = 0$
19.	In a non-linear programming problem,
Option A:	All the constraints should be linear
Option B:	All the constraints should be non-linear

Option C:	Either the objective function or atleast one of the constraints should be non-linear
Option D:	The objective function and all constraints should be linear.
20.	Pick the non-linear constraint
Option A:	$xy + y \geq 7$
Option B:	$2x - y \leq 5$
Option C:	$x + y \leq 6$
Option D:	$x + 2y = 9$

Subjective/descriptive questions

Q2 **(20 Marks)**	**Solve any Four out of Six5 marks each**
A	In an exam taken by 800 candidates, the average and standard deviation of marks obtained (normally distributed) are 40% and 10% respectively. What should be the minimum score if 350 candidates are to be declared as passed
B	If A= $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$, By using Cayley-Hamilton theorem find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 + 2A + I$
C	Evaluate the following integral using Cauchy-Residue theorem. $I = \int_C \frac{z^2+3z}{\left(z+\frac{1}{4}\right)^2 (z-2)} dz$ where c is the circle $\left\|z - \frac{1}{2}\right\| = 1$
D	Obtain inverse z-transform $\frac{z+2}{z^2-2z-3}$, $1 < \|z\| < 3$
E	Solve by the Simplex method Maximize $z = 10x_1 + x_2 + x_3$ Subject to $x_1 + x_2 - 3x_3 \leq 10$ $4x_1 + x_2 + x_3 \leq 20$ $x_1, x_2, x_3 \geq 0$
F	Using Lagrange's multipliers solve the following NLPP Optimise $z = 4x_1 + 8x_2 - x_1^2 - x_2^2$ Subject to $x_1 + x_2 = 2$ $x_1, x_2 \geq 0$

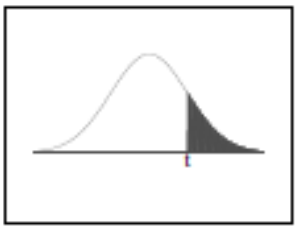
Q3 **(20 Marks)**	**Solve any Four out of Six5 marks each**
A	When the first proof of 392 pages of a book of 1200 pages were read, the distribution of printing mistakes were found to be as follows. No of mistakes in page (X): 0 | 1 | 2 | 3 | 4 No. of pages (f): 275 | 72 | 30 | 7 | 5 Fit a poisson distribution to the above data and test the goodness of fit.

B	Show that the matrix $\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -5 & -2 \end{bmatrix}$ is not diagonalizable.
C	If $f(z) = \frac{z-1}{(z-3)(z+1)}$ obtain Taylor's and Laurent's series expansions of f(z) in the domain $\|z\| < 1 \& 1 < \|z\| < 3$ respectively.
D	If $f(k) = \frac{1}{2^k} * \frac{1}{3^k}$ find $z\{f(k)\},\ k \geq 0$
E	Solve using dual simplex method Minimize $z = 2x_1 + 2x_2 + 4x_3$ $2x_1 + 3x_2 + 5x_3 \geq 2$ Subject to $3x_1 + x_2 + 7x_3 \leq 3$ $x_1 + 4x_2 + 6x_3 \leq 5$ $x_1, x_2, x_3 \geq 0$
F	Solve following NLPP using Kuhn-Tucker method Maximize $z = 2x_1^2 - 7x_2^2 - 16x_1 + 2x_2 + 12x_1x_2 + 7$ Subject to $2x_1 + 5x_2 \leq 105$ $x_1, x_2 \geq 0$

Standard Normal Distribution Table

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998

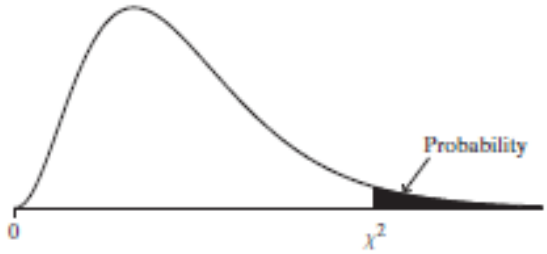
t-Distribution Table



The shaded area is equal to α for $t = t_\alpha$.

df	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
32	1.309	1.694	2.037	2.449	2.738
34	1.307	1.691	2.032	2.441	2.728
36	1.306	1.688	2.028	2.434	2.719
38	1.304	1.686	2.024	2.429	2.712
∞	1.282	1.645	1.960	2.326	2.576

TABLE C: Chi-Squared Distribution Values for Various Right-Tail Probabilities



	Right-Tail Probability						
df	0.250	0.100	0.050	0.025	0.010	0.005	0.001
1	1.32	2.71	3.84	5.02	6.63	7.88	10.83
2	2.77	4.61	5.99	7.38	9.21	10.60	13.82
3	4.11	6.25	7.81	9.35	11.34	12.84	16.27
4	5.39	7.78	9.49	11.14	13.28	14.86	18.47
5	6.63	9.24	11.07	12.83	15.09	16.75	20.52
6	7.84	10.64	12.59	14.45	16.81	18.55	22.46
7	9.04	12.02	14.07	16.01	18.48	20.28	24.32
8	10.22	13.36	15.51	17.53	20.09	21.96	26.12
9	11.39	14.68	16.92	19.02	21.67	23.59	27.88
10	12.55	15.99	18.31	20.48	23.21	25.19	29.59
11	13.70	17.28	19.68	21.92	24.72	26.76	31.26
12	14.85	18.55	21.03	23.34	26.22	28.30	32.91
13	15.98	19.81	22.36	24.74	27.69	29.82	34.53
14	17.12	21.06	23.68	26.12	29.14	31.32	36.12
15	18.25	22.31	25.00	27.49	30.58	32.80	37.70
16	19.37	23.54	26.30	28.85	32.00	34.27	39.25
17	20.49	24.77	27.59	30.19	33.41	35.72	40.79
18	21.60	25.99	28.87	31.53	34.81	37.16	42.31
19	22.72	27.20	30.14	32.85	36.19	38.58	43.82
20	23.83	28.41	31.41	34.17	37.57	40.00	45.32
25	29.34	34.38	37.65	40.65	44.31	46.93	52.62
30	34.80	40.26	43.77	46.98	50.89	53.67	59.70
40	45.62	51.80	55.76	59.34	63.69	66.77	73.40
50	56.33	63.17	67.50	71.42	76.15	79.49	86.66
60	66.98	74.40	79.08	83.30	88.38	91.95	99.61
70	77.58	85.53	90.53	95.02	100.4	104.2	112.3
80	88.13	96.58	101.8	106.6	112.3	116.3	124.8
90	98.65	107.6	113.1	118.1	124.1	128.3	137.2
100	109.1	118.5	124.3	129.6	135.8	140.2	149.5

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev2019

Examination: BE Semester IV

Course Code: ITC402 and Course Name: Computer Network and Network Design

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.	OSI stands for
Option A:	Open system interconnection
Option B:	Operating system interface
Option C:	Optical service implementation
Option D:	Open service internet
2.	Which topology is most fastest topology?
Option A:	Star
Option B:	Hybrid
Option C:	Mesh
Option D:	Bus
3.	Which medium has the highest transmission speed?
Option A:	Coaxial Cable
Option B:	Optical fiber cable
Option C:	Twisted pair cable
Option D:	Electrical cable
4.	A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 011111000100, then the input bit-string is
Option A:	Output = 01111100100
Option B:	Output = 011111100100
Option C:	Output = 011111001100
Option D:	Output = 0111111111
5.	In CSMA/CD, the frame transmission time (Tt) should be _____ the propogation time(Tp)
Option A:	Tt > Tp
Option B:	Tt>=2Tp
Option C:	Tt>2Tp
Option D:	Tt > 1/Tp
6.	What is the total vulnerable time value of pure Aloha?
Option A:	1/2 Tfr
Option B:	Tfr
Option C:	2*Tfr
Option D:	4*Tfr

7.	A subset of a network that includes all the routers but contains no loops is called _____
Option A:	spanning tree
Option B:	cost tree
Option C:	path tree
Option D:	special tree
8.	In IPv6, the _____ field in the base header restricts the lifetime of a datagram.
Option A:	version
Option B:	next-header
Option C:	hop limit
Option D:	neighbour-advertisement
9.	The term _____ means that IP provides no error checking or tracking. IP assumes the unreliability of the underlying layers and does its best to get a transmission through to its destination, but with no guarantees.
Option A:	Reliable delivery
Option B:	Connection oriented delivery
Option C:	Best effort delivery
Option D:	Worst delivery
10.	OSPF protocol uses which algorithm?
Option A:	Distance Vector
Option B:	Path Vector
Option C:	Link State Routing
Option D:	RIP
11.	Which of the following transport layer protocols is used to support electronic mail?
Option A:	SMTP
Option B:	IP
Option C:	TCP
Option D:	UDP
12.	In TCP, one end can stop sending data while still receiving data. This is called a _____ termination.
Option A:	half-close
Option B:	half-open
Option C:	full-close
Option D:	Full open
13.	Which of the following functionalities must be implemented by a transport protocol over and above the network protocol?
Option A:	Recovery from packet losses
Option B:	Detection of duplicate packets
Option C:	Packet delivery in the correct order
Option D:	End to end connectivity
14.	In TCP, if the ACK value is 200, then byte _____ has been received successfully.
Option A:	199

Option B:	200
Option C:	201
Option D:	202
15.	The second phase of JPEG compression process is _____.
Option A:	DCT transformation
Option B:	Quantization
Option C:	lossless compression encoding
Option D:	None of the choices are correct.
16.	During an FTP session the data connection may be opened _____.
Option A:	only once
Option B:	only two times
Option C:	Five times
Option D:	as many times as needed
17.	The protocol data unit (PDU) for the application layer in the Internet stack is ____.
Option A:	segment.
Option B:	datagram.
Option C:	message.
Option D:	frame.
18.	A table of a router normally contains addresses belonging to _____ protocol.
Option A:	a single
Option B:	Two
Option C:	Three
Option D:	multiple
19.	The first address assigned to an organization in classless addressing _____.
Option A:	must be a power of 2
Option B:	must be a power of 4
Option C:	must belong to one of the A, B, or C classes
Option D:	must be evenly divisible by the number of addresses
20.	An organization is granted a block of classless addresses with the starting address 199.34.32.0/27. How many addresses are granted?
Option A:	4
Option B:	8
Option C:	16
Option D:	32
Q2.	**Solve any Two out of Three** **10 marks each**
A	Explain the OSI Model in brief with suitable figure
B	What is a sliding window? Explain Go back N protocol in detail
C	What do you mean by switching? What are the types of switching techniques

<table>
<tr><td>Q3.</td><td>Solve any Two out of Three 10 marks each</td></tr>
<tr><td></td><td></td></tr>
<tr><td>A</td><td>What is congestion and what are causes of congestion?</td></tr>
<tr><td>B</td><td>Compare TCP and UDP.</td></tr>
<tr><td>C</td><td>Consider five source symbols of a discrete memory less source. Their probabilities are given below. Find the Huffman code for eace symbol.

<table><tr><td>Symbol</td><td>M1</td><td>M2</td><td>M3</td><td>M4</td></tr><tr><td>probability</td><td>0.4</td><td>0.3</td><td>0.2</td><td>0.1</td></tr></table></td></tr>
</table>

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev 2019

Examination: BE Semester IV

Course Code: ITC 403 and Course Name: Operating 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.	What is operating system?
Option A:	Collection of programs that manages hardware resources
Option B:	System service provider to the application programs
Option C:	Interface between user and hardware
Option D:	Collection of programs that manages Software resources
2.	Which of the following is not the Network Operating system ?
Option A:	Ubuntu
Option B:	Windows 7
Option C:	Unix
Option D:	Mach
3.	--- provides the interface to access the services of operating system.
Option A:	System calls
Option B:	API
Option C:	Library
Option D:	Command interpreter
4.	The process enters from ------- state to ------ when interrupt occurs.
Option A:	Ready, Running
Option B:	Running, Waiting
Option C:	Running, Ready
Option D:	Waiting, Running
5.	Which of the statement is correct from the following statements? I. The long-term scheduler selects the process form the job pool and loads into the main memory II. The short-term scheduler selects the process from waiting queue and allocates to the processor for execution III. The execution frequency of short-term scheduler is more than long term scheduler IV. The medium-term scheduler executes less frequently than long term scheduler
Option A:	I and II
Option B:	II and III
Option C:	III and IV
Option D:	I and III

6.	In RR scheduling algorithm if the time quantum is increased more, then it acts as a ----- algorithm
Option A:	FCFS
Option B:	SJF
Option C:	Multilevel Queue
Option D:	Priority
7.	In which of the load balancing the specific task find for imbalance on each processor, if found then moves processes form one overloaded processor to Idle one.
Option A:	Pull Migration
Option B:	Push Migration
Option C:	Mutually exclusive Pull and Push Migration
Option D:	Hyper threading Algorithm
8.	The productive operating system, checks for the deadlock --------
Option A:	Every time the process requests recourse
Option B:	After a specific time interval
Option C:	When a system is in unsafe state
Option D:	Every time a resource request is made at a fixed time interval
9.	In a certain application a value of counting semaphore is 17. The following operations were completed on the semaphores in the given order 2P, 20P, 5V, 10V, 10P, 2P. What would be the new value of counting semaphore?
Option A:	2
Option B:	10
Option C:	0
Option D:	3
10.	Which of the statements are true in case of recovery from Deadlock ? I Ignore the processes which are in deadlock state II Abort all resources which are in deadlock III Abort one process at a time until deadlock cycle is eliminated IV Abort the process which requests the deadlocked resources
Option A:	Only III
Option B:	Only IV
Option C:	II and III
Option D:	Only IV
11.	In dynamic storage allocation problem, the --- fit and --- fit are preferable than ---- fit.
Option A:	Worst, First, Best
Option B:	Best, First, Worst
Option C:	Worst, Best, First
Option D:	Worst, First, Best
12.	Which of the sentence is false? I Valid bit indicates that the page is in process's logical address space II Valid and Invalid bits provides protection. III Invalid bit indicates that the page is not in process's logical address space IV Shared pages do not have the Valid, Invalid bits

Option A:	IV
Option B:	III
Option C:	I and II
Option D:	I and III
13.	Generally, each process has an associated ------
Option A:	Segment Table
Option B:	Page Table
Option C:	Cache
Option D:	Virtual Memory
14.	Which of the following are the likely causes of thrashing? I. There are too many applications in the system II. The segment size was very small III. First in first out policy is followed IV. Least recently used policy for page replacement is used
Option A:	II and IV
Option B:	I and III
Option C:	II and III
Option D:	I and IV
15.	After an allocation of space using the worst-fit policy the number of holes in memory --- .
Option A:	Increases by one
Option B:	Decreases by one
Option C:	Remains same
Option D:	Memory Reduces by the process size
16.	If there are 32 segments, each of size 1KB ,then the logical address should have ----
Option A:	13 bit
Option B:	14 bit
Option C:	15 bit
Option D:	16 bit
17.	----- causes file system fragmentation.
Option A:	Unused space or single file are not contiguous
Option B:	Used space is not contiguous
Option C:	Used space is non-contiguous
Option D:	Multiple files are non-contiguous
18.	Which of the statement is true
Option A:	RAID level 0 supports byte stripping
Option B:	RAID level 1 allows bit stripping
Option C:	RAID level 0 supports no mirroring and RAID 1 supports mirroring with block striping
Option D:	RAID protects against data protection.
19.	The number of applications in any given task at a particular time in Android are ----
Option A:	One
Option B:	Many
Option C:	Few

Option D:	Zero
20.	Which of the following which is not the characteristics of embedded system
Option A:	Real time operation
Option B:	Reactive Operation
Option C:	Continuity
Option D:	I/O device flexibility

Q2	**Solve any Two Questions out of Three 10 marks each**
A	Consider following processes. Calculate the Waiting and Turnaround time for each process using SJF and RR algorithm. Time quantum is 3. Process Id | Burst Time | Arrival Time P1 | 8 | 0 P2 | 4 | 1 P3 | 9 | 2 P4 | 5 | 3
B	What is a thread? How multithreading is beneficial? Compare and contrast different multithreading models.
C	What is semaphore and its types? How the classic synchronization problem -Dining philosopher is solved using semaphores?

Q3	**Solve any Two Questions out of Three 10 marks each**
A	Consider the page reference string 1,2,3,5,2,4,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Calculate the Page fault using 1. Optimal 2. LRU 3. FIFO algorithms for a memory with three frames.
B	Consider the snapshot of a system. Answer the following questions based on Bankers Algorithm | | Allocation | Max | Available | | | ABCD | ABCD | ABCD | | P0 | 0012 | 0012 | 1520 | | P1 | 1000 | 1750 | | | P2 | 1354 | 2356 | | | P3 | 0632 | 0652 | | | P4 | 0014 | 0656 | | i. What is the content of Need Matrix? ii. Is the system is safe state? What is the safe sequence?
C	What is open-source operating system? What are the design issues of Mobile operating system and Real time operating system?

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev 2019

Examination: BE Semester IV

Course Code: ITC404 and Course Name: AUTOMATA THEORY

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 symbol is used to represent a Transition Function of Finite Automata?
Option A:	β
Option B:	δ
Option C:	∑
Option D:	ε
2.	What is the language of Finite Automata?
Option A:	Recursive Language
Option B:	Context-Sensitive Language
Option C:	Regular Language
Option D:	Context-Free Language
3.	Number of states in NFA are
Option A:	Less than or equal to equivalent DFA
Option B:	Less than equivalent DFA
Option C:	Greater than equivalent DFA
Option D:	Greater than or equal to equivalent DFA
4.	What is the correct form of productions in Chomsky Normal Form?
Option A:	A -> aB
Option B:	A - > BC
Option C:	A -> B
Option D:	A -> Ba
5.	The language WW^R is accepted by-
Option A:	Deterministic Pushdown Automata
Option B:	Non-Deterministic Finite Automata
Option C:	Deterministic Finite Automata
Option D:	Non-Deterministic Pushdown Automata
6.	The transition δ (q1,a,a) = (q_f , ε) of PDA is -
Option A:	Performing delete and pop operation
Option B:	Performing delete operation only
Option C:	Performing pop operation only
Option D:	Performing push operation
7.	What is the language of the Turing machine?

Option A:	Regular language
Option B:	Context free language
Option C:	Recursive enumerable language
Option D:	Context sensitive language
8.	What is the limitation of regular grammar?
Option A:	Can generate simple strings
Option B:	Can only describe regular language
Option C:	Can't generate long strings
Option D:	Too difficult to understand
9.	DFA designed to accept strings with no more than 2 a's can accept:
Option A:	a b a b
Option B:	a b a a
Option C:	b a a a
Option D:	a b a b a b a b
10.	The length of Moore machine compared to Mealy machine is:
Option A:	Equal to Mealy machine for given input
Option B:	Smaller than Mealy machine for given input
Option C:	One smaller than Mealy machine for given input
Option D:	One longer than Mealy machine for given input
11.	Derivation process is one which-
Option A:	Parses given string
Option B:	Generates new string
Option C:	Convert string to right linear grammar
Option D:	Convert string to left linear grammar
12.	Language of PDA is:
Option A:	Recursively Enumerable language
Option B:	Regular Language
Option C:	Context sensitive language
Option D:	Context free language
13.	The tuple Σ in Turing machine represents-
Option A:	Tape symbol
Option B:	Output symbol
Option C:	Tape alphabet
Option D:	Input alphabet
14.	A Turing Machine can compute problems which are-
Option A:	Complex
Option B:	Simple
Option C:	Unsolvable
Option D:	Computable
15.	Which of the following languages are most suitable for implementing context free languages?
Option A:	C

Option B:	Perl
Option C:	Assembly Language
Option D:	Compiler language
16.	With reference to the process of conversion of a context free grammar to CNF, the number of variables to be introduced for the terminals are: S->AB0 A->001 B->A1
Option A:	3
Option B:	4
Option C:	2
Option D:	5
17.	Next move function δ of a Turing machine M = (Q, Σ , Γ, δ, q0, B, F) is a mapping
Option A:	δ : Q x Σ --> Q x Γ
Option B:	δ : Q x Γ ---> Q x Σ x {L, R}
Option C:	δ : Q x Σ ---> Q x Γ x {L, R}
Option D:	δ : Q x Γ ---> Q x Γ x {L, R}
18.	Which of the following grammars are in Chomsky Normal Form:
Option A:	S->AB|BC|CD, A->AB B->CD, C->2, D->3
Option B:	S->AB, S->BCA|0|1|2|3
Option C:	S->ABa, A->aab, B->Ac
Option D:	S->ABa, A->AAB, B->Ac
19.	The lexical analysis for a high level language needs the power of which one of the following machine models?
Option A:	Turing Machine
Option B:	Deterministic pushdown automata
Option C:	Finite state automata
Option D:	Non-Deterministic pushdown automata
20.	Which of the following relates to Chomsky hierarchy?
Option A:	Regular<CFL<CSL<Unrestricted
Option B:	CFL<CSL<Unrestricted<Regular
Option C:	CSL<Unrestricted<CF<Regular
Option D:	CSL<Unrestricted< Regular<CF

Q2.	**Solve any Four questions out of Six. 5 marks each**
A	Construct DFA to accept strings that ends with substring 110 for Σ={0,1}
B	Design a Moore machine which counts the occurrence of substring bab in an input string for Σ = {a, b}.
C	Give Regular Expressions for i) For all strings over a,b which contains exactly 3 occurrence of b over Σ={a,b} ii) For all strings over 0,1 that starts with 10 and ends with 01
D	Let G be the grammar having the following set of production. S → ABA, A→ aA | bA | ϵ

	B→ bbb Find LMD and RMD for string “ababbbba”
E	Write Short Note on Chomsky Hierarchy
F	Compare and Contrast between FA, PDA and TM

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Convert the given grammar G to CNF. G: S -> a | aA | B |C , A -> aB | ε , B -> Aa, C -> aCD | a, D -> ddd.
B	Design a Turing Machine for 2’s Complement of a binary number
C	Design PDA for odd length palindrome let Σ = {0, 1}, $L = \{WCW^R\}$ $where$ $W \in \Sigma^*$

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Information Technology**

Curriculum Scheme: Rev2019

Examination: BE Semester IV

Course Code:ITC405 and Course Name: Computer Organization & Architecture

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.	Memory mapped I/O means
Option A:	Using separate memory address space for I/O ports
Option B:	Assigning a part of the main memory address space to I/O ports
Option C:	Using separate input and output instructions
Option D:	Using combined input and output instructions
2.	Instruction AND is executed by
Option A:	Decoder unit
Option B:	ALU
Option C:	Memory unit
Option D:	Control unit
3.	In memory Hierarchy which is the fastest memory
Option A:	SRAM
Option B:	DRAM
Option C:	Register
Option D:	Cache
4.	Cache memory is also known as
Option A:	Content Addressable Memory
Option B:	Content Accessible Memory
Option C:	Computer Addressable Memory
Option D:	Computer Accessible Memory
5.	Micro program consisting of _____ is stored in control memory of control unit
Option A:	Instructions
Option B:	micro instructions
Option C:	micro program
Option D:	macro program
6.	Choose appropriate sequence of instruction cycle
Option A:	Instruction fetch, Instruction address calculation, Instruction decode, operand address calculation , fetch operand, data operation, operand address calculation, operand store

Option B:	Instruction address calculation , Instruction fetch, operand address calculation fetch operand, Instruction decode, data operation, operand address calculation and operand store
Option C:	Instruction address calculation , Instruction fetch, Instruction decode, operand address calculation , fetch operand, data operation , operand address calculation, operand store
Option D:	Instruction address calculation, Instruction fetch, Instruction decode, operand address calculation , fetch operand, operand address calculation , operand store, data operation
7.	In Instruction Pipelining Structural Hazard means
Option A:	any condition in which either the source or the destination operands of an instruction are not available at the time expected in the pipeline
Option B:	a delay in the availability of an instruction causes the pipeline to stall
Option C:	the situation when two instructions require the use of a given hardware resource at the same time.
Option D:	When a data gets overwritten by branching
8.	Convert number($41.62)_8$ into equivalent hexadecimal number
Option A:	$(20.D8)_{16}$
Option B:	$(21.C8)_{16}$
Option C:	$(21.D8)_{16}$
Option D:	$(20.C8)_{16}$
9.	The sign and magnitude representation for +7 is
Option A:	00001000
Option B:	10000101
Option C:	10000111
Option D:	00000111
10.	8086 has 20 bit address lines to access memory, hence it can access
Option A:	100 MB
Option B:	1 KB
Option C:	1 MB
Option D:	10 MB
11.	The advantage of DMA is
Option A:	Avoiding busy waiting by CPU
Option B:	High speed data transfer between memory and I/O
Option C:	Polling
Option D:	Accessing CPU
12.	Program Counter Holds
Option A:	The Instruction
Option B:	The Data
Option C:	Address of the Current Instruction which is executed
Option D:	Address of the Next Instruction to be executed
13.	Which of the following is not a key characteristics of memory devices or memory system

Option A:	Location
Option B:	Physical Characteristics
Option C:	Availability
Option D:	Access Method
14.	In restoring division method when subtraction is said to be unsuccessful
Option A:	if result is positive
Option B:	if result is negative
Option C:	if result is zero
Option D:	if result is infinite
15.	The disadvantage of an SRAM is
Option A:	Very high power consumption
Option B:	Very high access time
Option C:	These are volatile memories
Option D:	Very low price
16.	The main memory contains 8K blocks, each consisting of 128 words. How many bits are there in a main memory address?
Option A:	19 bits
Option B:	21 bits
Option C:	22 bits
Option D:	20 bits
17.	In Restoring division Algorithm if A<0 then which of the following is immediate step (Assume M as Dividend Q as Divisor And A as result)
Option A:	Q_0 =0
Option B:	A= A +M
Option C:	Q_0 =0 & A=A-M
Option D:	Q_0 =0 & A=A+M
18.	Third generation of computer is between
Option A:	1940 and 1956
Option B:	1964 and 1971
Option C:	1972 and 2010
Option D:	1910 and 1930
19.	Find the output of full adder with A=1, B=0, C=1
Option A:	S=0,C=0
Option B:	S=0,C=1
Option C:	S=1,C=0
Option D:	S=1,C=1
20.	A combinational logic circuit which sends data coming from a single source to two or more separate destinations is
Option A:	MUX
Option B:	ENCODER
Option C:	DECODER
Option D:	DEMUX

Q2 **(20 Marks)**	***Solve any Four out of Six 5 marks each***
A	Explain the working of 8:1 Multiplexer.
B	Minimize the following four variable logic function using K-map f(A,B,C,D)=∑m(0,1,3,4,7,9,11,13,15)
C	Describe Flynn's classification of parallel computing in detail
D	Differentiate between Hardwired control unit and Micro programmed control unit
E	Identify the addressing modes of the following instructions 1.MOV AX,1000 2.MOV AX,[1000] 3.MOV AX,BX 4.MOV [BX],AX 5.MOV AX,[SI+200]
F	Write short note on DMA

Q3. **(20 Marks)**	***Solve any Two Questions out of Three 10 marks each***
A	Draw the flow chart of Booths algorithm for signed multiplication and Perform 7 x -3 using booths algorithm
B	Explain in detail with suitable Architecture of 8086 microprocessor
C	List and explain in detail characteristics /parameters of memory