University of Mumbai
Examination 2020

Program: Computer Engineering & IT
Curriculum Scheme: Rev2012/2016
Examination: Second Year Semester III
Course Code: SEITC 301 (CBSGS) and Course Name: Applied Mathematics-III
Time: 1 hour Max. Marks: 80

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All the Questions are compulsory and carry equal marks.

Q1.	Inverse Laplace transform of $f(s) = \frac{s}{s+1}$ is
Option A:	$\delta(t) - e^{-t}$
Option B:	$H(t) - e^{t}$
Option C:	$\delta(t) + e^{t}$
Option D:	$H(t) + e^{t}$
Q2.	Complex form of Fourier series in interval (-1,1) is
Option A:	$\sum_{-\infty}^{\infty} c_n e^{\frac{in\pi x}{L}}$
Option B:	$\sum_{n=1}^{\infty} c_n e^{in\pi x}$
Option C:	$\sum_{-\infty}^{\infty} c_n e^{in\pi x}$
Option D:	$\sum_{-\infty}^{\infty} c_n e^{nx}$
Q3.	Given $f(t) = \sin at$,then Laplace transform of $f'(t)$ is
Option A:	0
Option B:	$\frac{s}{s^2 + a^2}$
Option C:	$\frac{as}{s^2 + a^2}$
Option D:	$\frac{s}{(s^2 + a^2)^2}$
Q4.	The coefficient a_0 in Fourier series expansion of $f(x) = x^2$, $(0,\ 2\pi)$ is
Option A:	0
Option B:	$\frac{4\pi^2}{3}$

Option C:	$\frac{\pi^2}{4}$
Option D:	$\frac{\pi}{2}$
Q5.	If imaginary part of $f(z) = u + iv$ is $e^x \sin y$, then $f(z)$ is
Option A:	e^{iz}
Option B:	e^{-iz}
Option C:	e^{-z}
Option D:	e^{z}
Q6.	Laplace transform of $f(t) = e^t \sin 2t$ is
Option A:	$\frac{2}{s^2 - 2s + 5}$
Option B:	$-\frac{2}{s^2 - 2s + 5}$
Option C:	$\frac{s}{s^2 + 2s + 5}$
Option D:	$\frac{s + 1}{s^2 + 2s + 5}$
Q7.	Fourier coefficient b_n in expansion of $f(x) = \lvert x \rvert \sin x$ in interval $(-\pi, \pi)$ is
Option A:	$\frac{\pi(-1)^n}{n}$
Option B:	$\frac{\pi}{n}(-1)^{n+1}$
Option C:	0
Option D:	$\frac{\pi^2}{n}$
Q8.	If $f(z) = r^2 \cos 2\theta + i \sin p\theta$ is an analytic function ,then value of p is,
Option A:	1
Option B:	0
Option C:	2
Option D:	4
Q9.	Inverse Laplace transform of $f(s) = \frac{1}{s(s+4)}$ is
Option A:	$\frac{1 + e^{-4t}}{t}$
Option B:	$\frac{1 + e^{4t}}{t^2}$
Option C:	$\frac{1 - e^{-4t}}{4}$
Option D:	$\cos 4t$

Q10.	If $f(z) = u + iv$ is a harmonic function , then it will satisfy the differential equation
Option A:	$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$
Option B:	$\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial y^2} = 0$
Option C:	$\frac{\partial^2 u}{\partial z \partial \bar{z}} = 0$
Option D:	$\frac{\partial^2 v}{\partial x^2} - \frac{\partial^2 v}{\partial y^2} = 0$
Q11.	If $\emptyset = (x^2 + y^2 + z^2)$ then $grad\ \emptyset$ at (1,1,1,)
Option A:	0
Option B:	$2\hat{\imath} + 2\hat{\jmath} + 2\hat{k}$
Option C:	$\frac{2\hat{\imath} + 2\hat{\jmath} + 2\hat{k}}{\sqrt{8}}$
Option D:	$\sqrt{8}$
Q12.	If $f(x) = \cos x$ defined in $(-\pi, \pi)$then the value Fourier coefficient b_n is
Option A:	0
Option B:	π
Option C:	$\frac{\pi}{(n^2 - 1)}$
Option D:	$\frac{2\pi}{(n^2 - 1)}[(-1)^n - 1]$
Q13.	A transformation $w = \frac{az+b}{cz+d}$, is said to be bilinear if
Option A:	$ad - bc = 0$
Option B:	$ad - bc \neq 0$
Option C:	$ac - bd = 0$
Option D:	$ac - bd \neq 0$
Q14.	The critical points of transformation $w = z + \frac{1}{z}$ are
Option A:	± 1
Option B:	$\pm i$
Option C:	$\pm \frac{1}{2}$
Option D:	$\pm \frac{i}{2}$
Q15.	For a discrete random variable
Option A:	$\sum p_i = 0$
Option B:	$\sum p_i = -1$
Option C:	$\sum p_i = 1$

Option D:	$\sum p_i = 1/2$
Q16.	Image of a circle $\|z\| = a$ under the transformation $w = z = 3 + 2i$ is a
Option A:	$Circle$
Option B:	$Ellipse$
Option C:	$Hyperbola$
Option D:	$Straight\ line$
Q17.	The value of integral $\int_0^\infty \frac{e^{-t}\sin t}{t} dt$ is
Option A:	$\frac{\pi}{2}$
Option B:	$\frac{\pi}{4}$
Option C:	π
Option D:	1
Q18.	A continuous random variable has pdf $f(x) = k(x - x^2)$, $0 \le x \le 1$. Then k is,
Option A:	1
Option B:	½
Option C:	1/3
Option D:	6
Q19.	Half range sine series of a function $f(x)$ in $(0,\ l)$ is given by
Option A:	$\sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option B:	$b_0 + \sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option C:	$a_0 + \sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option D:	$a_0 - \sum_{n=1}^{\infty} b_n \sin nx$
Q20.	For a discrete random variable the mean is
Option A:	$\sum p_i = 1$
Option B:	$\sum x_i p_i$
Option C:	$\sum {x_i}^2 p_i$
Option D:	$\sum {x_i}^2 p_i - (\sum x_i p_i)^2$

Q2. **(20 Marks)**	**Solve any Four out of Six (5 marks each)**
A	*Find the inverse Laplace Transform of* $\frac{s^2}{(s^2+a^2)(s^2+b^2)}$
B	*Find the Fourier constant* a_n *for* $f(x) = x^2$, *where* $0 \leq x \leq a$.
C	*Find the analytic function* $f(z)$ *whose imaginary part is* $v = \frac{y}{x^2+y^2}$.
D	*Find the inverse Laplace Transform of* $\log(\frac{s+1}{s-1})$
E	A continuous random variable has pdf $f(x) = k(x - x^3)$, $0 \leq x \leq 1$. Fnd k and mean.
F	*The two lines of regression are 4Y=X +38and X-9Y=-288,find the respective means of X and Y and r.*

Q3. **(20 Marks)**	**Solve any Four out of Six (5 marks each)**
A	*Evaluate* $\int_0^\infty \frac{Cosat-Cosbt}{t} dt$.
B	If a random variable has a moment generating function $M_t = \frac{3}{3-t}$, *find the mean and standard deviation.*
C	*Find* $L\{e^{5t} + 4t^3\}$
D	The pdf of a random variable X is X: 0, 1, 2, 3, 4, 5, 6 P(X=x): k, 3k, 5k, 7k, 9k, 11k, 13k Find $P(2 \leq x \leq 6)$
E	*Determine the constants a, b, c, d if* $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ *is analytic.*
F	A man speaks truth 3 times out of 5. When a die is thrown he states that it gave an ace. What is the probability that this event has actually happened?

University Mumbai
Examination 2020

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: Computer Engineering

Curriculum Scheme: Rev2012

Examination: SESemesterIII

Course Code: CSC305 and Course Name: Discrete Structure

Time: 2 hour Max. Marks: 80

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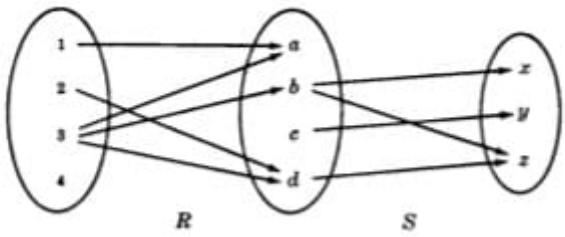
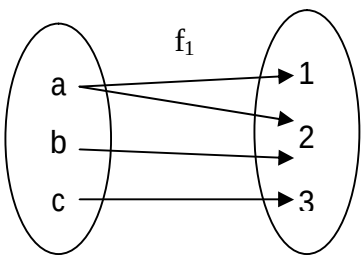
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	1) If A = { 1, 2, 3, 4, 5 } and B = { 4, 5, 6, 7, 8 } then the sets A ∩ B and A – B are
Option A:	Equal sets
Option B:	Independent sets
Option C:	Disjoint sets
Option D:	Dependent sets
2.	If A and B are sets and A∪ B= A ∩ B, then
Option A:	A = Φ
Option B:	B = Φ
Option C:	A = B
Option D:	A≠ B
3.	$(A \vee \neg A) \vee (q \vee T)$ is a _____
Optio	Tautology

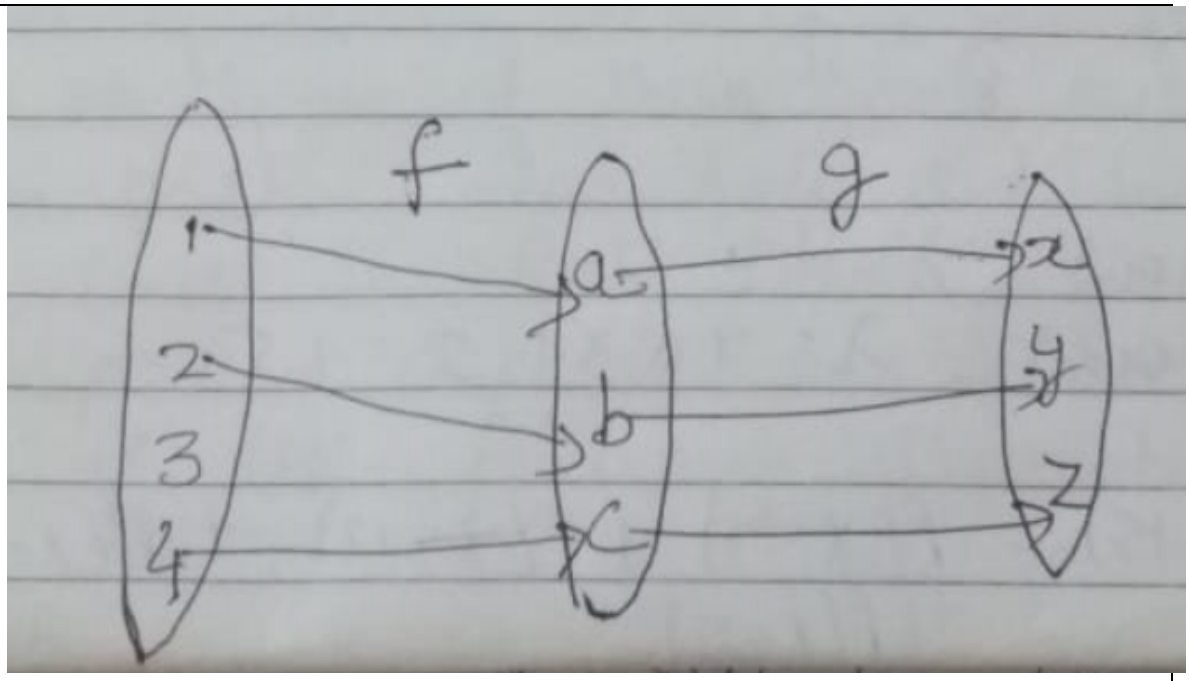
n A:	
Option B:	Contradiction
Option C:	Contingency
Option D:	Contrapositive
4.	I. $\neg\forall x(P(x))$ II. $\neg\exists x(P(x))$ III. $\neg\exists x(\neg P(x))$ IV. $\exists x(\neg P(x))$ which of the above two are equivalent?
Option A:	I and III
Option B:	I and IV
Option C:	II and III
Option D:	II and IV
5.	Let $B = \{y \in Z \mid y = 18b - 2$ for some integer $b\}$ and $C = \{z \in Z \mid z = 18c + 16$ for some integer $c\}$. Then
Option A:	$C \subseteq B$
Option B:	$B = C$
Option C:	$B \neq C$
Option D:	$B \subseteq C$

6.	Let $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and a relation R on A is defined as $R = \{(a, b): a - b$ is divisible by $2\}$. The equivalence class of 2
Option A:	$\{1, 2, 3, 4\}$
Option B:	$\{1, 2, 4, 8\}$
Option C:	$\{2, 4, 6, 8\}$
Option D:	$\{1, 3, 5\}$
7.	Let A={1,2,3} and R={(1,1),(1,2),(3,1),(3,3)} Find symmetric closure of R
Option A:	R_1={(1,1),(1,2),(3,1),(3,3),(2,2)}
Option B:	R_1={(1,1),(1,2),(3,1),(3,3),(2,2),(2,1)}
Option C:	R_1={(1,1),(1,2),(3,1),(3,3),(2,2),(2,1),(1,3)}
Option D:	R_1={(1,1),(1,2),(3,1),(3,3),(2,1),(1,3)}
8.	If the relations R and S are as given below , then R o S is given by ---------- 
Option A:	{ (2, z), (3, x), (3, z) }
Option B:	{ (1, x), (2, y), (3, z), (4,a) }
Option	{ (1, a), (2, d), (3, b) }

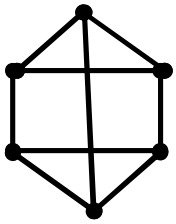
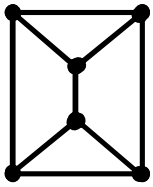
n C:	
Option D:	Does not exist
9.	Let A={2,3,6,12,24,36} with partial order of divisibility then least element of A is
Option A:	2
Option B:	36
Option C:	2,3
Option D:	No least element
10.	For $P(n): 1^2 + 3^2 + 5^2 + \cdots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$, L.H.S of P(k+1) is
Option A:	$\frac{k(2k-1)(2k+1)}{3}$
Option B:	$\frac{(k+1)(2k-1)(2k+1)}{3}$
Option C:	$\frac{(k+1)(2k-1)(2k+3)}{3}$
Option D:	$\frac{(k+1)(2k+1)(2k+3)}{3}$
11.	
Option A:	f1 is not a function
Option B:	f1 is a one to one function

Option C:	f1 is a onto function
Option D:	f1 is a one to one and onto function
12.	Let f be a function from R to R with f (x) = x^2. Which of the following statement is true?
Option A:	f is an one to one function
Option B:	f is a bijective function
Option C:	f is an invertible function
Option D:	f is an into function
13.	The generating function of the following series $(1, 2, 3, 4, 5, 6, \ldots \ldots \ldots \ldots \ldots)$ is
Option A:	$\frac{1}{(1-x)^2}$
Option B:	$\frac{1}{1-x^2}$
Option C:	$\frac{1}{1-x^3}$
Option D:	$\frac{1}{1-x}$
14.	In the arithmetic progression {5,9,13,17,…….} the recurrence relation is
Option A:	$a_n=a_{n-1}+4$,$a_1=5$, $n>2$
Option B:	$a_n=a_{n-1}+4$,$a_1=5$, $n \geq 2$
Option C:	$a_n=a_{n+1}+4$,$a_1=5$, $n \geq 2$

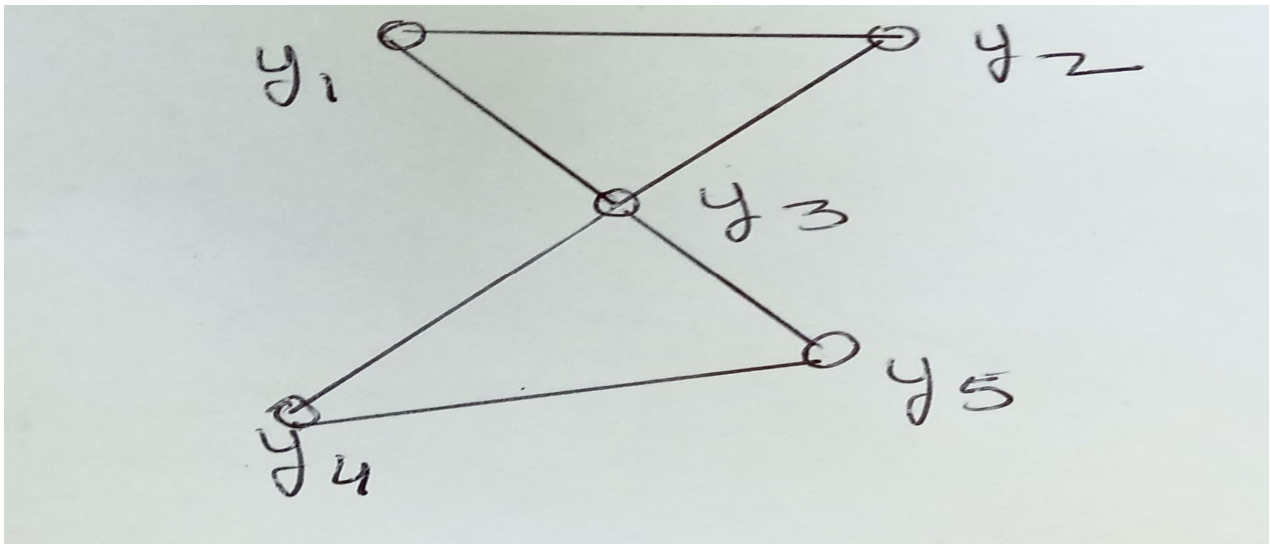
Option D:	$a_n=a_n+4$,$a_1=5$, $n \geq 2$
15.	Which of the following is not type of lattice
Option A:	Complemented lattice
Option B:	Distributive lattice
Option C:	Hasse diagram
Option D:	Bounded lattice
16.	Number of edges in complete graph with 7 vertices
Option A:	20
Option B:	19
Option C:	21
Option D:	14
17.	A graph with no edges is known as a _____
Option A:	Trivial graph
Option B:	Regular graph
Option C:	Bipartite graph
Option D:	complete graph
18.	State the properties of the functions f and g in the following figure.

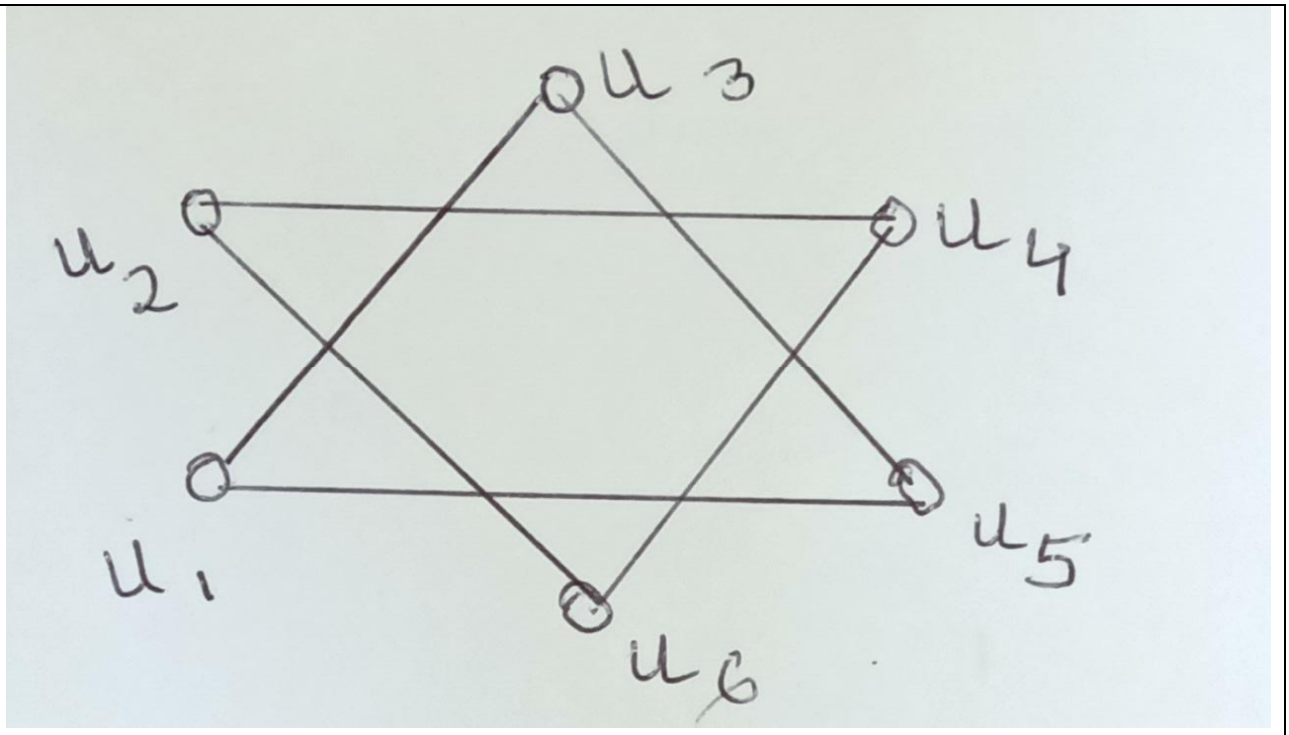
	
Option A:	f and g are both 1-1
Option B:	f is 1-1 and g is bijective
Option C:	f and g are only relations
Option D:	f is only a relation and g is biective
19.	Abelian Group is also called as
Option A:	Commutative
Option B:	Associative
Option C:	Distributive
Option D:	Multiplicative

20.	An (m ,n) coding function $e: B^m \rightarrow B^n$ can detect k or less errors if and only if its minimum distance is
Option A:	At least k+2
Option B:	At least k+1
Option C:	At least 2k+1
Option D:	At least 2k+2

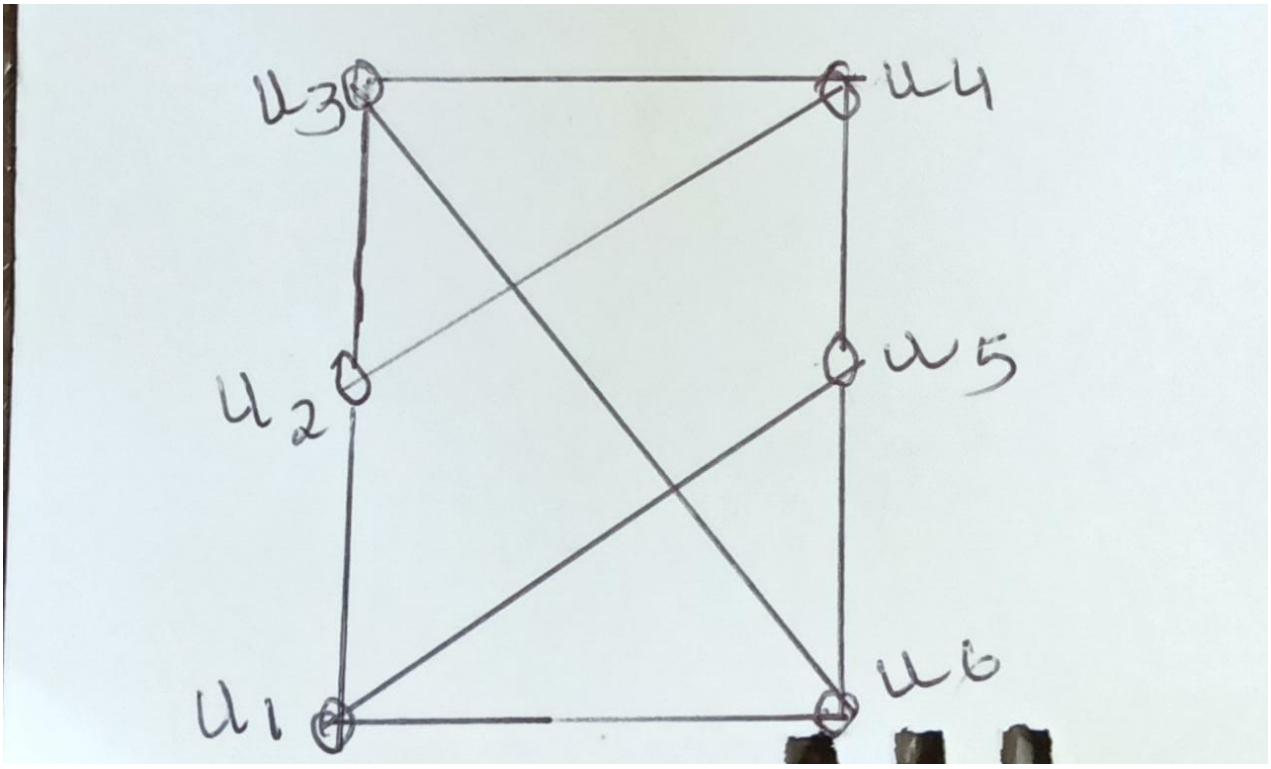
Q2	**Solve any Four out of Six (5 marks each)**
A	Three problems A, B and C have been given to a class of 80 students. It is found that 30 students solved A, 40 students solved B, 50 students solved C, 20 students solved both A and B, 25 students solved both B and C, 10 students solved both A and C, and 10 students solved all three problems. Fid the number of students who did not solved all three problems.
B	Let R be a relation on the set of integers Z defined by aRb if and only if $a \equiv m$ (mod 5). Prove that R is equivalence relation. Find Z/R.
C	Let $f: R \rightarrow R$ be a function defied as $f(x) = 2x + 3$and $g: R \rightarrow R$ be another function as $g(x) = x - 1$. Find $(g \circ f)^{-1}$
D	Solve the recurrence relation $a_n=3a_{n-1}-2a_{n-2}$ with initial condition $a_1=5$, $a_2=3$
E	Show that following two graphs are isomorphic.  **G1**  **G2**
F	Let H= $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ be a parity check matrix.

	Decode the following words relative to maximum likelyhood decoding function e_H. i) 011001 ii)101001 iii) 111010

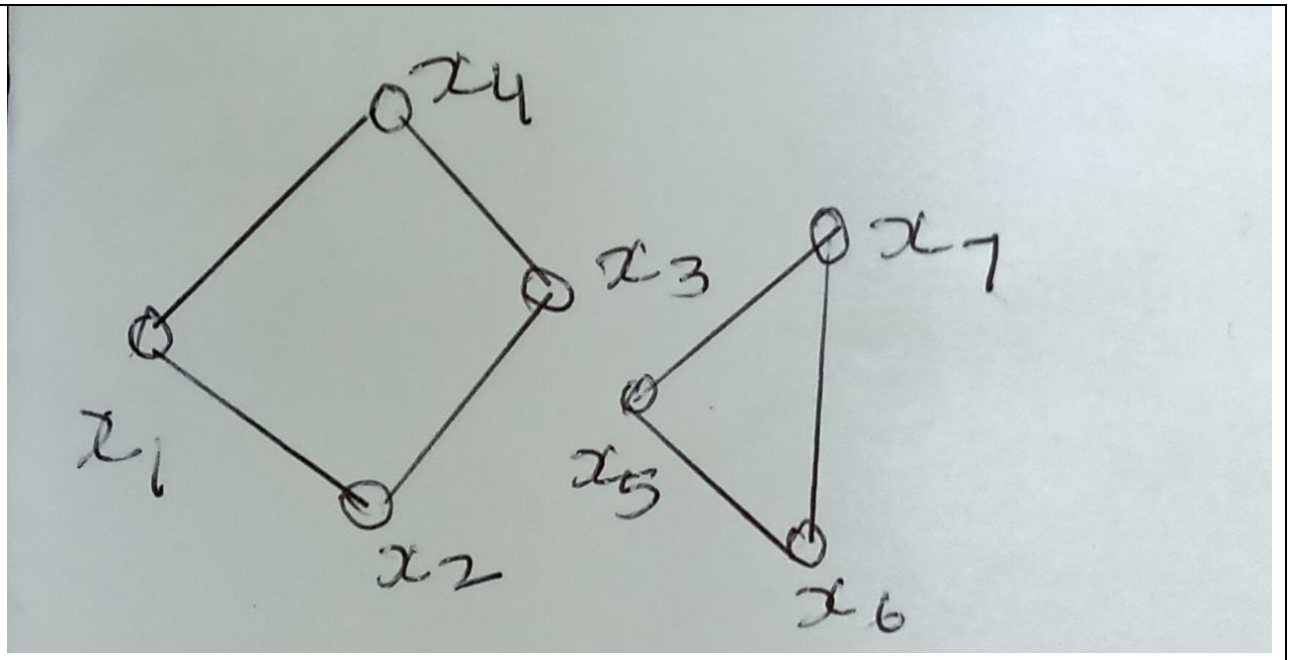
Q3	**Solve any Four out of Six (5 marks each)**
A	Using laws of logic simplify $\sim(p \wedge q) \rightarrow (\sim p \vee (\sim p \vee q))$
B	Let A={1,2,3,4} and R={(1,2), (2,3), (3,4), (2,1)}. Find transitive closure of R using Warshall's Algorithm
C	State Pigeonhole principle and extended pigeonhole principle. How many students must be in a class to guarantee that at least two students receive the same score on the final exam, if the exam is graded on a scale from 0 to 100 points?
D	Which of the following graphs has a Eulerian path or circuit? If it has mention the same. If it does not exist explain why.  Graph 1



Graph 2



Graph 3

	 Graph 4
E	Consider a set of integers Z. Let aR_b if $b = a^r$ for some positive integer r. Show that R is a partial order relation.
F	Prove that set G={1,2,3,4} is an Abelian group under multiplication modulo 5.

University Mumbai
Examination 2020

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: Computer Engineering

Curriculum Scheme: Rev2019

Examination: SE Semester : III Course Code: CSC 303

Course Name: **Data Structures**

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.	Process of inserting an element in stack is called _____
Option A:	Create
Option B:	Push
Option C:	Evaluation
Option D:	Pop
2.	The postfix form of the expression (A+ B)*(C*D- E)*F / G is?
Option A:	AB+ CD*E – FG /**
Option B:	AB + CD* E – F **G /
Option C:	AB + CD* E – *F *G /
Option D:	AB + CDE * – * F *G /
3.	What data structure would you mostly likely see in non recursive implementation of a recursive algorithm?
Option A:	Linked List
Option B:	Stack
Option C:	Queue
Option D:	Tree

4.	The process of accessing data stored in a serial access memory is similar to manipulating data on a _____
Option A:	Heap
Option B:	Binary Tree
Option C:	Array
Option D:	Stack
5.	The prefix form of A-B/ (C * D ^ E) is?
Option A:	-/*^ACBDE
Option B:	-ABCD*^DE
Option C:	-A/B*C^DE
Option D:	-A/BC*^DE
6.	Which of the following is not an inherent application of stack?
Option A:	Reversing a string
Option B:	Evaluation of postfix expression
Option C:	Implementation of recursion
Option D:	Job scheduling
7.	The data structure required for Breadth First Traversal on a graph is?
Option A:	Stack
Option B:	Array
Option C:	Queue
Option D:	Tree
8.	Circular Queue is also known as _____
Option A:	Ring Buffer
Option B:	Square Buffer

Option C:	Rectangle Buffer
Option D:	Curve Buffer
9.	Linked lists are not suitable for the implementation of _____
Option A:	Insertion sort
Option B:	Radix sort
Option C:	Polynomial manipulation
Option D:	Binary search
10.	In Linked List implementation, a node carries information regarding _____
Option A:	Data
Option B:	Link
Option C:	Data and Link
Option D:	Node
11.	A linear collection of data elements where the linear node is given by means of pointer is called?
Option A:	Linked list
Option B:	Node list
Option C:	Primitive list
Option D:	Unordered list
12.	Linked list is considered as an example of _____ type of memory allocation.
Option A:	Dynamic
Option B:	Static
Option C:	Compile time

Option D:	Heap
13.	Linked list data structure offers considerable saving in _____
Option A:	Computational Time
Option B:	Space Utilization
Option C:	Space Utilization and Computational Time
Option D:	Speed Utilization
14.	Heap can be used as _____
Option A:	Priority queue
Option B:	Stack
Option C:	A decreasing order array
Option D:	Normal Array
15.	Which of the following is not an inherent application of stack?
Option A:	Reversing a string
Option B:	Evaluation of postfix expression
Option C:	Implementation of recursion
Option D:	Job scheduling
16.	The type of expression in which operator succeeds its operands is?
Option A:	Infix Expression
Option B:	Prefix Expression
Option C:	Postfix Expression
Option D:	Both Prefix and Postfix Expressions

17.	Which of the following is not an inherent application of stack?
Option A:	Reversing a string
Option B:	Evaluation of postfix expression
Option C:	Implementation of recursion
Option D:	Job scheduling
18.	A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as _____
Option A:	Queue
Option B:	Stack
Option C:	Tree
Option D:	Linked List
19.	Queues serve major role in _____
Option A:	Simulation of recursion
Option B:	Simulation of arbitrary linked list
Option C:	Simulation of limited resource allocation
Option D:	Simulation of heap sort
20.	Which of the following is not the type of queue?
Option A:	Ordinary queue
Option B:	Single ended queue
Option C:	Circular queue
Option D:	Priority queue

Q2 .	**(20 Marks)**
A	**Solve any Two 5 marks each**

i.	*State application of stack. Explain one. (5)*
ii.	*State the types of Linked List in detail.(5)*
iii.	*What is a Binary Search Tree? Give one of its application.(5)*
B	**Solve any One 10 marks each**
i.	*What is Topological Sort? Explain it with an example of a DAG.(10)*
ii.	*Explain Huffman Coding with an example.*

Q3.	**Solve any four questions of 5 marks each. (20 marks)**
A	What is a Data Structure? Explain in details?
B	Differentiate between stack and a queue?
C	Explain the polynomial addition application of Linked Lists?
D	What is Hashing? Explain the different types?
E	What are the tree traversals?
F	Differentiate between DFS and BFS.

University of Mumbai
Examination 2020

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2019

Examination: SE SemesterIII

Course Code: CSC304and Course Name: Digital Logic and Computer Organization and Architecture

Time: 2 hourMax. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Digital circuit can be made by the repeated use of ……
Option A:	OR gates
Option B:	NOT gates
Option C:	NAND gates
Option D:	X-NOR gate
2.	A full-adder circuit has both the inputs 1 and the carry-in is also 1. Its sum and carry outputs will be ---------- and ----------.
Option A:	1 and 0
Option B:	0 and 1
Option C:	0 and 0
Option D:	1 and 1
3.	A combinational circuit is one in which the output depends on the _____
Option A:	Input combination at the time
Option B:	Input combination and the previous output
Option C:	Input combination at that time and the previous input combination
Option D:	Present output and the previous output

4.	Hexadecimal equivalent of 101.0101 111 is
Option A:	5.5E
Option B:	5.58
Option C:	A.58
Option D:	A.5E
5.	The Gray code equivalent of $(3A7)_{16}$ is
Option A:	010110001011
Option B:	01000011100
Option C:	001001110100
Option D:	001110100111
6.	On Subtracting $(5C)_{16}$ from $(3F)_{16}$ using 2's Complement, we get
Option A:	$(1D)_{16}$
Option B:	$(E3)_{16}$
Option C:	$(114)_{16}$
Option D:	$(133)_{16}$
7.	If addressing bits are 20 then main memory capacity is----
Option A:	1KB
Option B:	1MB
Option C:	2KB
Option D:	20KB
8.	When the ISR is completed ,the state of processor is----
Option A:	Registered
Option B:	Displayed

Option C:	Restored
Option D:	Observed
9.	String of significant digit is known as----
Option A:	Mantissa
Option B:	sign
Option C:	normalize
Option D:	exponent
10.	In restoring division algorithm which step is/are common in all cycle.
Option A:	Shift left
Option B:	Shift right
Option C:	Shift right, A-M
Option D:	Shift left, A-M
11.	In non restoring division Quotient is in----
Option A:	A
Option B:	M
Option C:	Q
Option D:	Count
12.	In Booths algorithm when Q_0 and Q_{-1} bits are equal then do-----
Option A:	Right shift
Option B:	Right shift and A+M
Option C:	Arithmetic Right shift
Option D:	Left shift and A+M
13.	During fetch cycle opcode is loaded into---
Option A:	IR

Option B:	MAR
Option C:	PC
Option D:	MBR
14.	In instruction store B then B=
Option A:	B←PC
Option B:	B←AC
Option C:	B←IR
Option D:	B←B
15.	MOV AX (500) is
Option A:	Direct Addressing mode
Option B:	Indirect Addressing mode
Option C:	Immediate Addressing mode
Option D:	Register Addressing mode
16.	While handling multiple interrupt sequential interrupt is
Option A:	Nested Interrupt
Option B:	Enable Interrupt
Option C:	Disable Interrupt
Option D:	Allow Interrupt
17.	Microprogram for all instruction are stored in-----
Option A:	Main memory
Option B:	Cache memory
Option C:	Control memory
Option D:	Secondary memory
18.	Volatile memory is typically used for --

Option A:	Primary storage
Option B:	Secondary storage
Option C:	Territory storage
Option D:	Temporary storage
19.	The criteria for selecting a particular block to be replaced is decided by
Option A:	Mapping function
Option B:	Write policy
Option C:	Data transfer technique
Option D:	Replacement policy
20.	In memory hierarchy -----is at top of the memory hierarchy pyramid.
Option A:	Cache
Option B:	Main memory
Option C:	Hard disk
Option D:	Register

Q2	
A	**Solve any Two 5 marks each**
i.	*Why bus arbitration is required and explain Daisy Chaining method.*
ii.	*Represent the decimal number **27** in binary using (i) Binary Code (ii) BCD Code (iii) Octal Code (iv) Hexadecimal Code*
iii.	*Explain anyone data transfer technique.*
B	**Solve any One** **10marks each**
i.	*Explain Flynn's classification.*
ii.	*Explain Booths algorithm with the help of flowchart and multiply signed*

	number 17 x 3.
Q3.	
A	**Solve any Two 5 marks each**
i.	Show the 8-bit subtraction of (+68) and (-43) using 2's Complement representation.
ii.	*Explain in detail hardwired control unit. Discuss one method to implement it.*
iii.	*Explain segmentation.*
B	**Solve any One** **10marks each**
i.	*Design a 16:1 multiplexer using 4:1 multiplexer*
ii.	*If main memory 64 KB, cache memory 4KB,Block size 32 bytes then design cache using direct mapping function and find no of cache lines, tag bits,word bits*

University of Mumbai
Examination 2020

Examinations Commencing from from 7th January 2021 to 20th January 2021

Program: Computer Engineering

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: CSC305_and Course Name: Computer Graphics

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.	Initial value of d in Midpoint ellipse in region 1 is given by
Option A:	$B^2 – A^2B + A^2/4$
Option B:	2DY – DX
Option C:	1 – R
Option D:	B – AB + 4A
2.	In midpoint ellipse, at the junction of region 1 and region 2
Option A:	$XB^2 = YA^2$
Option B:	$XB^2 > YA^2$
Option C:	$XB^2 < YA^2$
Option D:	XB^2 != YA^2
3.	Q3. Seed fill algorithm is classified as _____ fill and _____fill.
Option A:	FLOOD, BOUNDARY
Option B:	EVEN, ODD
Option C:	SCAN, FLOOD
Option D:	BOUNDARY, SCAN
4.	Seed fill algorithm may be either _____connect or _____ connect
Option A:	2, 4
Option B:	4, 8

Option C:	8, 16
Option D:	4, 4
5.	Seed fill algorithm is
Option A:	Recursive
Option B:	Non-recursive
Option C:	Object oriented
Option D:	Procedure oriented
6.	Slope of ellipse at the junction of region 1 and region 2 is
Option A:	1
Option B:	0
Option C:	-1
Option D:	Infinite
7.	Point is consider outside the polygon if value of winding number is
Option A:	Zero
Option B:	One
Option C:	Non Zero
Option D:	Infinite
8.	Q8. After Scaling the ΔABC, where A (0,0), B (20,20), C (40,0), 0.5 units in X-direction and 0.5 units in Y-direction by keeping point B fixed, the new co-ordinates of ΔABC will be
Option A:	A (10,10), B (20,20), C (30,10)
Option B:	A (0.5, 0.5), B (20.5,20.5), C (45,5)
Option C:	A (20,20), B (40,40), C (60,20)
Option D:	A (10,10), B (20,20), C (40,0)
9.	A composite transformation matrix is obtained by determining the -------- of

	matrix of individual transformation
Option A:	Sum
Option B:	Product
Option C:	Sum of Product
Option D:	Product of sum
10.	Which is the correct equation for 3D rotation about X-axis
Option A:	$x' = x; y' = y \cos \theta - z \sin \theta; z' = y \sin \theta + z \cos \theta$
Option B:	$x` = x \cos \theta - y \sin \theta; y` = x \sin \theta - y \cos \theta; z` = z$
Option C:	$x' = x \cos \theta + z \sin \theta; y' = y; z' = z \cos \theta - x \sin \theta$
Option D:	$x' = x; y' = y \sin \theta - z \cos \theta; z' = y \cos \theta + z \sin \theta$
11.	The transformation in which an object can be shifted to any coordinate position in three dimensional plane is called
Option A:	Shearing
Option B:	Scaling
Option C:	Rotation
Option D:	Translation
12.	On multiplying the matrix of the individual transformation representation sequences, we obtain a
Option A:	Projection transformation
Option B:	Construct solid geometry method
Option C:	Composite transformation
Option D:	Isometric Projection
13.	We can represent a three-dimensional object by a ---------- also.
Option A:	Method
Option B:	Equation
Option C:	Point

Option D:	Angle
14.	Q14. In Sutherland Hodgeman Polygon Clipping Algorithm, vertices of _____ polygon are processed in order against the _____ rectangular window boundaries to produce an output vertex list for the clipped polygon.
Option A:	Concave, four
Option B:	Convex, two
Option C:	Concave, two
Option D:	Convex, four
15.	In Weiler Atherton Polygon Clipping Algorithm, which of the below statement is correct?
Option A:	For an outside-to-inside pair of vertices follow the polygon boundary.
Option B:	For an outside-to-inside pair of vertices follow the window boundary.
Option C:	For an inside-to-outside pair of vertices follow the polygon boundary.
Option D:	For an outside-to-inside pair of vertices no boundary to be followed.
16.	In Back Face Detection Method, a point (x,y,z) is inside the polygon surface if:
Option A:	Ax+By+Cz+D<0
Option B:	Ax+By+Cz+D>0
Option C:	Ax+By+Cz+D=0
Option D:	Ax+By+Cz+Dx<0
17.	In Z-buffer Method, the depth buffer and the refresh buffer are initialized to :
Option A:	depth(x,y)=1, refresh(x,y)= Intensity of background
Option B:	depth(x,y)=0, refresh(x,y)= Intensity of Surface
Option C:	depth(x,y)=1, refresh(x,y)= Intensity of Surface
Option D:	depth(x, y)=0, refresh(x, y)= Intensity of background
18.	In Area Subdivision Method, which of the 4 following conditions is false for no further subdivision?

Option A:	All surfaces are outside surfaces with respect to the given area
Option B:	Only one inside, overlapping, or surrounding surface, is in the area
Option C:	All surfaces are inside surfaces with respect to the given area
Option D:	A surrounding surface obscures all other surfaces within the area boundaries.
19.	Compared to Image Space Methods , Object space Methods of Visible Surface Detection
Option A:	Take Less time
Option B:	Use Continous Operations
Option C:	Are less accurate
Option D:	Fall under Raster Scan Systems
20.	The matrix representation for translation in homogeneous coordinates is
Option A:	P'=T+P
Option B:	P'=S*P
Option C:	P'=R*P
Option D:	P'=T*P

Q.2

A. Solve any Two 5 marks each

i. Give advantage and disadvantage of DDA and BRESENHAM line drawing algorithm.
ii. Derive initial value D_0 for BRESENHAM line drawing algorithm.
iii. Compare BEZIER curve with B-SPLINE curve.

B. Solve any one 10 marks each

i. Given a line AB where A(0,0) and B(5,2) calculate all the points lying on a line using BRESENHMA line drawing algorithm.

ii. Given a triangle ABC where A(0,0), B(10,10) and C(-10,10) apply 180^0 rotation. Find the new coordinate of point P after rotation.

Q.3

A. Solve any Two 5 marks each

i. Explain Depth Buffer method for visible surface detection.
ii. Explain Cohen-sutherland line clipping algorithm
iii. Give matrix for shear and reflection transformation.

B. Solve any one 10 marks each

i. Clip the given line AB where A(30,5) and B(30,55) against a clipping rectangle where Xwmin = 20, Ywmin = 20, Xwmax = 40 and Ywmax = 40 using Liang Barsky line clipping algorithm.

ii. Define composite transformation. Derive composite transformation matrix for rotation at an arbitrary point.