Subject Code: BCS303

PAPER ID-311571

Roll No:

BTECH
(SEM III) THEORY EXAMINATION 2023-24
DISCRETE STRUCTURES & THEORY OF LOGIC

TIME: 3HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

Q no.	Question	Marks	CO
a.	Determine the greatest lower bound and least upper bound of the set {2, 3, 6}, if they exist, in the Poset (D24, /).	2	1
b.	Express power set of each of these sets. 1) {Ø,{ Ø}} 2) {a,{a}}	2	1
c.	Investigate whether the function f(x) = x^2 -1 is injective or not for f: R→R.	2	2
d.	Express E(x, y, z) = xy+ y'z into its complete sum-of-products form.	2	2
e.	Construct inverse of the following statement "If I wake up early in the morning, then I will be healthy."	2	3
f.	Show that identity element is unique in a group.	2	4
g.	Compare Euler circuit and Hamiltonian circuit.	2	5

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

Q no.	Question	Marks	CO
a.	Construct the Hasse Diagram for (P(S), ⊆) where P(S) is a power set defined on set S={a, b, c}. Determine whether it is a Lattice or not.	7	1
b.	Solve the following Boolean functions using K-map: (i) F(A,B,C,D) = ∑ (m0,m1,m2,m4,m5,m6,m8,m9,m12,m13,m14) (ii) F(A,B,C,D) = ∑ (0,2,5,7,8,10,13,15)	7	2
c.	Show the validity of the following argument: hypotheses: "It is not sunny this afternoon and it is colder than m yesterday. We will go swimming only if it is sunny. If we do not go swimming, then we will take a canoe trip. If we take a canoe trip, then we will be home by sunset. conclusion: "We will be home by sunset."	7	3
d.	Let G= {1, -1, i, - i} with the binary operation multiplication be an algebraic structure, where i = √-1 then determine whether G is an Abelian group. Also if G is cyclic Group, then determine the generator of G.	7	4
e.	Explain Pigeon hole principle. Describe generalized form of Pigeon hole principle. If 6 colors are to paint 37 homes. Show that at least 7 of them will be of same color.	7	5

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(SEM III) THEORY EXAMINATION 2023-24
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TIME: 3HRS **M.MARKS: 70**

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Let R be a binary relation on the set of all strings of 0 and 1 such that R = {(a,b): a and b have same number of 0's}. Show that whether R is reflexive, symmetric, transitive or a partial order relation.	7	1
b.	Show that (D42, /) is lattice. Compare the distributive and complemented lattice with example.	7	1

4. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Solve the following Boolean function using K-map: F(A,B,C) = (1,2,5,7) and D(0,4,6) using SOP.	7	2
b.	If f: R→R, g : R→R and h: R→R defined by $f(x) = 3x^2+2$, $g(x) =7x-5$ and $h(x) = 1/x$. Compute the following composition functions. (i) (fogoh)(x) (ii) (gog)(x) (iii) (goh)(x)	7	2

5. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Test the validity of the following argument. "If there was a ball game, then traveling was difficult. If they arrived on time, then traveling was not difficult. They arrived on time. Therefore, There was no ball game."	7	3
b.	Describe $\exists$ and $\forall$ Quantifiers with example. "There is someone who got an A in the course" convert this sentence into predicate logic using quantifiers. Prove the following argument. All man are mortal. Socrates is a man. Therefore, Socrates is mortal.	7	3

6. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Describe Algebraic structure, semigroup, monoid and group. Also explain the relationship among them.	7	4
b.	Consider group G = {1, 2, 3, 4, 5, 6} under multiplication modulo 7. (a) Construct the multiplication table of G. (b) Compute 2^{-1}, 3^{-1}, 6^{-1} (c) Compute the orders and subgroups generated by 2 and 3. (d) Is G cyclic?	7	4

7. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Compare bipartite and complete graph with example. Draw $K_{3,4}$ and K_5. Explain why these two graphs are not planar.	7	5
b.	Show that $K_{3,3}$ satisfies in equality $\|E\| \leq 3\ \|V\| - 6$, but it is non-planar.(V=No. of Vertices, E=No. of Edges, R=No. of Regions)	7	5

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Paper Id: 233534 | Roll No.

B. TECH.
(SEM-III) THEORY EXAMINATION 2022-23
DISCRETE STRUCTURES & THEORY OF LOGIC

Time: 3 Hours | ***Total Marks: 100***

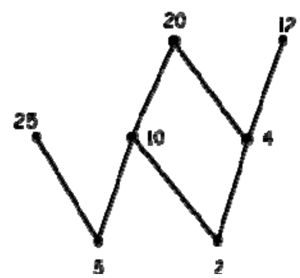
Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

(a) Identify whether $\lceil x+y \rceil = \lceil x \rceil + \lceil y \rceil$, $\forall x,y \in R$, where $\lceil x \rceil$ is a ceiling function

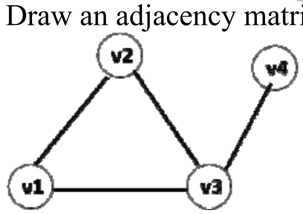
(b) Find the Maximal elements and minimal elements form the following Hasse's diagram



(c) Define what is Big-O notation with respect of growth of functions.

(d) Find the composite mapping **gof** if
f: R→R is given by $\mathbf{f(x) = e^x}$ and g: R→R is given by $\mathbf{g(x) = \sin x}$

(e) Draw an adjacency matrix for the following graph



(f) Let $\mathbf{A = \{ \Phi, b\}}$, then calculate $\mathbf{A \cup P(A)}$, where P(A) is a power set of A.

(g) Draw the Hasse's diagram of the POSET $(L, \subseteq)$, where
$L = \{S_0, S_1, S_2, S_3, S_4, S_5, S_6, S_7\}$, where the sets are given by
$S_0 = \{a,b,c,d,e,f\}$, $S_1 = \{a,b,c,d,e\}$, $S_2 = \{a,b,c,e,f\}$,
$S_3 = \{a,b,c,e\}$, $S_4 = \{a,b,c\}$, $S_5 = \{a,b\}$, $S_6 = \{a,c\}$, $S_7 = \{a\}$

(h) Describe Planar graph and express Euler's formula for planar graph.

(i) Define normal subgroup.

(j) Identify whether $\mathbf{(p \wedge q) \rightarrow (p \vee q)}$ is tautology or contradiction with using Truth table.

SECTION B

2. **Attempt any *three* of the following:** **10x3=30**

(a) Identify whether the each of the following relations defined on the set X = {1,2,3,4} are reflexive, symmetric, transitive and/or antisymmetric?

(i) R_1 = { (1,1), (1,2), (2,1) }

(ii) R_2 = { (1,1), (1,2), (1,4), (2,1), (2,2), (3,3), (4,1), (4,4) }

(iii) R_3 = { (2,1), (3,1), (3,2), (4,1), (4,2), (4,3) }

(b) Let a function is defined as **f: R-{3}→ R-{1}, f(x) = (x-1)/(x-3)** , then **show** that f is a bijective function and also compute the inverse of f. Where R is a set of real numbers.

(c) **(i)** Express Converse, Inverse and Contrapositive of the following statement **"If x+5=8 then x=3"**

(ii) Show that the statements **P↔Q** and **(P ∧ Q) V(⌉ P ∧ ⌉ Q)** are equivalent

(d) Express the following

- (i) Euler graph and Hamiltonian graph
- (ii) Chromatic number of a graph
- (iii) Walk and path
- (iv) Bipartite graph

(e) Solve the following recurrence relation by using **generating function**. $\mathbf{a_n + 5a_{n-1} + 6a_{n-2} = 42.\ 4^n}$ **, where** $\mathbf{a_0 = 1}$ **and** $\mathbf{a_1 = -2}$

SECTION C

3. **Attempt any *one* part of the following:** **10x1=10**

(a) Let **G = {1,-1,** $i, -i$**}** with the operation of ordinary multiplication on G be an algebraic structure, where i=**√-1**.

- (i) Determine whether G is abelian.
- (ii) Determine the order of each element in G.
- (iii) Determine whether G is a cyclic group, if G is a cyclic group, then determine the generator/generators of the group G.
- (iv) Determine a subgroup of the group G.

(b) Let (G,*) and G',*') be any two groups and let e and e' be their respective identities. If f is a homomorphism of G into G', then prove that

- (i) f(e) = e'
- (ii) $f(x^{-1}) = [f(x)]^{-1}$, ∀ x ∈G

4. **Attempt any *one* part of the following:** **10x1=10**

(a) Use generating function to find the number of ways Rs 23 can by paid by using 4 coins of Rs 5, 6 coins of Rs 2 and 4 coins of Rs 1.

(b) Using Pigeonhole principle find the minimum number n of integers to be selected from S={1,2,3,4,5,6,7,8,9} so that

(i) the sum of two of the integers is even

(ii) the difference of two of the n integers is 5

5. **Attempt any *one* part of the following:** **10x1=10**

(a) Define complemented lattice and then show that in a distributive lattice, if an element has a complement then this complement is unique.

(b) Solve the following Boolean functions using K-map:

(i) $\mathbf{F(A,B,C,D) = \sum(m_0, m_1, m_2, m_4, m_5, m_6, m_8, m_9, m_{12}, m_{13}, m_{14})}$

(ii) **$F(A,B,C,D)=\sum(0,2,5,7,8,10,13,15)$**

6. Attempt any *one* part of the following: 10x1=10

(a) Prove the validity of the following argument.
If Mary runs for office, She will be elected. If Mary attends the meeting, she will run for office. Either Mary will attend the meeting or she will go to India. But Mary cannot go to India.
"Thus Mary will be elected".

(b) Convert the following two statements in quantified expressions of predicate logic

(i) For every number there is a number greater than that number.
(ii) Sum of every two integer is an integer.
(iii) Not Every man is perfect.
(iv) There is no student in the class who knows Spanish and German

7. Attempt any *one* part of the following: 10x1=10

(a) Prove that the set of residues F={0,1,2,3,4} modulo 5 is a field w.r.t. addition and multiplication of residue classes modulo 5. i.e. $(F, +_5, X_5)$ is a field.

(b) Define Boolean algebra. **Show** that **a'.[(b'+c)'+ b.c] + [(a+b')'.c] = a'.b** using rules of Boolean Algebra. Where **a'** is the complement of an element **a**.

PAPER ID-411824

Roll No:

BTECH
(SEM III) THEORY EXAMINATION 2021-22
DISCRETE STRUCTURES & THEORY OF LOGIC

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2x10 = 20

Qno.	Question	Marks	CO
a.	Let A = {1,2,3,4,5,6} be the set and R = {(1,1) (1,5) (2,2) (2,3) (2,6) (3,2) (3,3,) (3,6) (4,4) (5,1) (5,5) (6,2) (6,3) (6,6)} be the relation defined on set A. Find Equivalence classes induced by R.	2	1
b.	Solve Ackerman Function A (2,1).	2	1
c.	State and justify "Every cyclic group is an abelian group".	2	2
d.	State Ring and Field with example.	2	2
e.	Differentiate complemented lattice and distributed lattice.	2	3
f.	State De Morgan's law and Absorption Law.	2	3
g.	Translate the conditional statement "If it rains, then I will stay at home" into contrapositive, converse and inverse statement.	2	4
h.	State Universal Modus Ponens and Universal Modus Tollens laws.	2	4
i.	Explain Euler's formula. Determine number of regions if a planar graph has 30 vertices of degree 3 each.	2	5
j.	Explain pigeonhole principle with example.	2	5

SECTION B

2. Attempt any *three* of the following: 3x10 =30

Qno.	Question	Marks	CO
a.	Justify that for any sets A, B, and C: i) $(A - (A \cap B)) = A - B$ ii) $(A - (B \cap C)) = (A - B) \cup (A - C)$	10	1
b.	Explain Cyclic group. Let H be a subgroup of a finite group G. Justify the statement "the order of H is a divisor of the order of G".	10	2
c.	Solve $E(x,y,z,t) = \sum (0,2,6,8,10,12,14,15)$ using K-map.	10	3
d.	Construct the truth table for the following statements: i) $(P \rightarrow Q') \rightarrow P'$ ii) $P \leftrightarrow (P' \vee Q')$.	10	4
e.	Solve the recurrence relation using generating function. $\mathbf{a_{n+2} - 5a_{n+1} + 6a_n = 2}$**, with** $\mathbf{a_0=3}$ **and** $\mathbf{a_1=7}$**.**	10	5

SECTION C

3. Attempt any *one* part of the following: 1x10 =10

Qno.	Question	Marks	CO
a.	State Principle of Duality. Let A denote the set of real numbers and a relation R is defined on A such that (a,b)R(c,d) if and only if $a^2 + b^2 = c^2 + d^2$. Justify that R is an equivalence relation.	10	1
b.	i) Let R = {(1,2) (2,3) (3,1)} defined on A = {1,2,3}. Find the transitive closure of R using Warshall's algorithm. ii) Justify that "If f: A→B and g: B→C be one-to-one onto functions, then gof is also one to one onto and $(gof)^{-1} = f^{-1} o\, g^{-1}$".	10	1

BTECH
(SEM III) THEORY EXAMINATION 2021-22
DISCRETE STRUCTURES & THEORY OF LOGIC

4. Attempt any *one* part of the following: 1x10 =10

Qno.	Question	Marks	CO
a.	Define the binary operation * on Z by x*y=x + y + 1 for all x,y belongs to set of integers. Verify that (Z,*) is abelian group? Discuss the properties of abelian group.	10	2
b.	i) Justify that "The intersection of any two subgroup of a group (G,*) is again a subgroup of (G,*)". ii) Justify that "If a,b are the arbitrary elements of a group G then $(ab)^2 = a^2b^2$ if and only if G is abelian.	10	2

5. Attempt any *one* part of the following: 1x10 =10

Qno.	Question	Marks	CO
a.	Define Modular Lattice. Justify that if 'a' and 'b' are the elements in a bounded distributive lattice and if 'a' has complement a′. then I) $a \vee (a' \wedge b) = a \vee b$ II) $a \wedge (a' \vee b) = a \wedge b$	10	3
b.	i) Justify that (D_{36},\) is lattice. ii) Let L_1 be the lattice defined as D_6 and L_2 be the lattice (P(S), ≤), where P(S) be the power set defined on set S= {a, b}. Justify that the two lattices are isomorphic.	10	3

6. Attempt any *one* part of the following: 1x10 =10

Qno.	Question	Marks	CO
a.	Use rules of inference to Justify that the three hypotheses (i) "If it does not rain or if it is not foggy, then the sailing race will be held and the lifesaving demonstration will go on." (ii) "If the sailing race is held, then the trophy will be awarded." (iii) "The trophy was not awarded." imply the conclusion (iv) "It rained."	10	4
b.	Justify that the following premises are inconsistent. (i) If Nirmala misses many classes through illness then he fails high school. (ii) If Nirmala fails high school, then he is uneducated. (iii) If Nirmala reads a lot of books then he is not uneducated. (iv) Nirmala misses many classes through illness and reads a lot of books.	10	4

7. Attempt any *one* part of the following: 1x10 =10

Qno.	Question	Marks	CO
a.	Explain the following terms with example: i. Graph coloring and chromatic number. ii. How many edges in K_7 and $K_{3,3}$ iii. Isomorphic Graph and Hamiltonian graph. iv. Bipartite graph. v. Handshaking theorem.	10	5
b.	i. Justify that "In a undirected graph the total number of odd degree vertices is even". ii. Justify that "The maximum number of edges in a simple graph is n(n-1)/2".	10	5

Subject Code: KCS303

PAPER ID-311218

Roll No:

B TECH
(SEM-III) THEORY EXAMINATION 2020-21
DISCRETE STRUCTURE & THEORY OF LOGIC

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

Q no.	Question	Marks	CO
a.	Check whether the function $f(x) = x^2 - 1$ is injective or not for $f : R \rightarrow R$.	2	CO3
b.	Let R be a relation on set A with cardinality n. Write down the number of reflexive and symmetric relation on set A.	2	CO2
c.	Define group.	2	CO3
d.	Define ring.	2	CO3
e.	Let A = {1, 2, 3, 4, 6, 8, 9, 12, 18, 24} be ordered by the relation 'a divides b'. Find the Hasse diagram.	2	CO3
f.	If L be a lattice, then for every a and b in L prove that $a \wedge b = a$ if and only if $a \leq b$.	2	CO3
g.	Write the negation of the following statement: "If I wake up early in the morning, then I will be healthy."	2	CO1
h.	Express the following statement in symbolic form: "All flowers are beautiful."	2	CO1
i.	Define complete and regular graph.	2	CO4
j.	Prove that the maximum number of vertices in a binary tree of height h is 2^{h+1}, $h \geq 0$.	2	CO4

SECTION B

2. Attempt any *three* of the following:

Q no.	Question	Marks	CO
a.	If $f : R \rightarrow R$, $g : R \rightarrow R$ and $h : R \rightarrow R$ defined by $f(x) = 3x^2 + 2$, $g(x) = 7x - 5$ and $h(x) = 1/x$. Compute the following composition functions i. (fogoh)(x) ii. (gog)(x) iii. (goh)(x) iv. (hogof)(x)	10	CO3
b.	State and prove Lagrange theorem for group.	10	CO3
c.	Prove that in any lattice the following distributive inequalities hold i. $a \wedge (b \vee c) \geq (a \wedge b) \vee (a \wedge c)$ ii. $a \vee (b \wedge c) \leq (a \vee b) \wedge (a \vee c)$	10	CO3
d.	Prove the validity of the following argument "If I get the job and work hard, then I will get promoted. If I get promoted, then I will be happy. I will not be happy. Therefore, either I will not get the job, or I will not work hard."	10	CO1
e.	If a connected planar graph G has n vertices, e edges and r region, then $n - e + r = 2$.	10	CO5

Roll No:

SECTION C

3. Attempt any *one* part of the following:

a.	Prove by mathematical induction for all positive integers that $3.5^{2n+1} + 2^{3n+1}$ is divisible by 17.	10	CO2
b.	Find the numbers between the 100 to1000 that are divisible by 3 or 5 or 7.	10	CO2

4. Attempt any *one* part of the following:

a.	A subgroup H of a group G is a normal subgroup if and only if $g^{-1}hg \in H$ for every $h \in$ and $g \in G$.	10	CO3
b.	In a group (G, *) prove that i. $(a^{-1})^{-1} = a$ ii. $(ab)^{-1} = b^{-1}a^{-1}$	10	CO3

5. Attempt any *one* part of the following:

a.	Simplify the Boolean function $F(A, B, C, D) = \sum(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 11)$ Also draw the logic circuit of simplified F.	10	CO3
b.	Simplify the following Boolean expressions using Boolean algebra i. $xy + x'z + yz$ ii. $C(B + C)(A + B + C)$ iii. $A + B(A + B) + A(A' + B)$ iv. $XY + (XZ)' + XY'Z(XY + Z)$	10	CO3

6. Attempt any *one* part of the following:

a.	Define tautology, contradiction and contingency? Check whether $(p \vee q) \wedge (\sim p \vee r) \rightarrow (q \vee r)$ is a tautology, contradiction or contingency.	10	CO1
b.	Translate the following statements in symbolic form i. The sum of two positive integers is always positive. ii. Everyone is loved by someone. iii. Some people are not admired by everyone. iv. If a person is female and is a parent, then this person is someone's mother.	10	CO1

7. Attempt any *one* part of the following:

a.	Construct the binary tree whose inorder and preorder traversal is given below. Also, find the postorder traversal of the tree. Inorder: d, g, b, e, i, h, j, a, c, f Preorder: a, b, d, g, e, h, i, j, c, f	10	CO4
b.	Solve the following recurrence relation $a_n - a_{n-1} + 20a_{n-2} = 0$ where $a_0 = -3$, $a_1 = -10$	10	CO3

 Sub Code:KCS303

Paper Id: 110323 Roll No:

B. TECH.
(SEM III) THEORY EXAMINATION 2019-20
DISCRETE STRUCTURES & THEORY OF LOGIC

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Qno.	Question	Marks	CO
a.	Define various types of functions.	2	CO1
b.	How many symmetric and reflexive relations are possible from a set A containing 'n' elements?	2	CO1
c.	Let Z be the group of integers with binary operation * defined by $a*b=a+b-2$, for all $a,b\in Z$. Find the identity element of the group $\langle Z,*\rangle$	2	CO2
d.	Show that every cyclic group is abelian.	2	CO2
e.	Prove that a lattice with 5 elements is not a boolean algebra.	2	CO3
f.	Write the contra positive of the implication: "if it is Sunday then it is a holiday".	2	CO4
g.	Show that the propositions $p\rightarrow q$ and $\neg p\vee q$ are logically equivalent.	2	CO4
h.	Show that there does not exist a graph with 5 vertices with degrees 1, 3, 4, 2, 3 respectively.	2	CO5
i.	Obtain the generating function for the sequence 4, 4, 4, 4, 4, 4, 4	2	CO5
j.	Define Pigeon hole principle.	2	CO5

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

Qno.	Question	Marks	CO
a.	Prove that $\frac{1}{\sqrt{1}}+\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{3}}+.........+\frac{1}{\sqrt{n}}>\sqrt{n}$ for $n\geq 2$ using principle of mathematical induction	10	CO1
b.	What do you mean by cosets of a subgroup? Consider the group Z of integers under addition and the subgroup H = {…., -12, -6, 0, 6 12, ……} considering of multiple of 6 (i) Find the cosets of H in Z (ii) What is the index of H in Z.	10	CO2
c.	Show that the following are equivalent in a Boolean algebra $a\leq b\Leftrightarrow a*b'=0\Leftrightarrow b'\leq a'\Leftrightarrow a'\oplus b=1$	10	CO3
d.	Show that $((P\vee Q)\wedge\neg(\neg Q\vee\neg R))\vee(\neg P\vee\neg Q)\vee(\neg P\vee\neg R)$ is a tautology by using equivalences.	10	CO4
e.	Define planar graph. Prove that for any connected planar graph, v – e+ r = 2 Where v, e, r is the number of vertices, edges, and regions of the graph respectively.	10	CO5

Sub Code:KCS303

Paper Id: 110323 **Roll No:**

SECTION C

3. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Find the numbers between 1 to 500 that are not divisible by any of the integers 2 or 3 or 5 or 7.	10	CO1
b.	Is the "divides" relation on the set of positive integers transitive? What is the reflexive and symmetric closure of the relation? $R = \{(a, b) \mid a > b\}$ on the set of positive integers?	10	CO1

4. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	What is Ring? Define elementary properties of Ring with example.	10	CO2
b.	Prove or disprove that intersection of two normal subgroups of a group G is again a normal subgroup of G.	10	CO2

5. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Let $(L, \vee, \wedge, \leq)$ be a distributive lattice and $a, b \in L$. if $a \wedge b = a \wedge c$ and $a \vee b = a \vee c$ then show that $b = c$	10	CO3
b.	Obtain the principle disjunctive and conjunctive normal forms of the formula $(\square\ p \rightarrow r) \wedge (q \leftrightarrow p)$	10	CO3

6. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Explain various Rules of Inference for Propositional Logic.	10	CO4
b.	Prove the validity of the following argument "if the races are fixed so the casinos are crooked, then the tourist trade will decline. If the tourist trade decreases, then the police will be happy. The police force is never happy. Therefore, the races are not fixed.	10	CO4

7. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Solve the following recurrence equation using generating function G (K) -7 G (K-1) + 10 G (K-2) = 8K + 6	10	CO5
b.	A collection of 10 electric bulbs contain 3 defective ones (i) In how many ways can a sample of four bulbs be selected? (ii) In how many ways can a sample of 4 bulbs be selected which contain 2 good bulbs and 2 defective ones? (iii) In how many ways can a sample of 4 bulbs be selected so that either the sample contains 3 good ones and 1 defectives ones or 1 good and 3 defectives ones?	10	CO5