Roll No. ☐☐☐☐☐☐☐☐☐☐

Total No. of Questions : 09 Total No. of Pages :02

B.Tech. (AI&ML/AI&DS/IT/CS/DS/IOT/CSE (Internet of Things and Cyber Security including Block Chain Technology)) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-06-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. **Answer briefly :**

   a) Prove that the inverse of a bijective function is unique.

   b) Find GCD (119, 884) using Euclid Algorithm.

   c) In a group of 150 people how many friends are there who have an identical number of friends in that group?

   d) A and B are two sets such that $n(A - B) = 14 + x$, $n(B - A) = 3x$ and $n(A \cap B) = x$. Find X such that $n(A) = n(B)$.

   e) Make the truth table of $p \wedge (\neg q)$ of two statements p and q.

   f) Prove that $\neg(\neg p) \equiv p$.

   g) In a Boolean algebra B, simplify the Boolean expression $x.(x' + y)$.

   h) Prove that the group $\{1, -1, \iota, -\iota\}$ under multiplication is a cyclic group.

   i) Prove that the maximum degree of any vertex in a simple graph having n vertices is $n-1$.

   j) Give an example of a perfect graph.

SECTION - B

2. Suppose R and S are symmetric relations on a set A. Show that $R \cap S$ is also symmetric.

3. In a group of 50 persons, 14 drink tea but not coffee and 30 drink tea. Find

   a) How many drink tea and coffee both?

   b) How many drink coffee but not tea?

4. Prove that $p \rightarrow q \equiv (\neg p) \vee q$.

5. Prove that finite integral domain is a field.

6. Prove that in any non-trivial tree, there are at least two vertices of degree 1.

SECTION - C

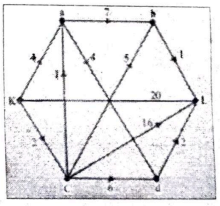
7. Find the Boolean expression that defines the function f by $f(0, 0, 0) = 0$; $f(0, 0, 1) = 0$; $f(1, 0, 0) = 1$; $f(1, 1, 0) = 0$: $f(0, 1, 0) = 1$: $f(0, 1, 1) = 0$; $f(1, 0, 1) = 1$; $f(1, 1, 1) = 1$.

8. a) If S is a set containing finite number of elements and f is a function from S into S, then prove that f is one-one, then f is onto.

   b) Show that $p \wedge q$ logically implies $p \leftrightarrow q$.

9. a) Find n if ${}^{n}C_4$, ${}^{n}C_5$ and ${}^{n}C_6$ are in AP.

   b) Find the shortest distance between K and L in the following graph :



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Roll No. | | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/AI/CSE/DS/IOT/IT/(Internet of Things and Cyber Security Including Block Chain Technology) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS/401/18

M.Code : 77626

Date of Examination : 04-01-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Answer briefly:**

(a) State Well-Ordering Principle.

(b) If R is an equivalence relation, then show that $\{R^{-1} = (a, b) : (b, a) \in R\}$ is also an equivalence relation.

(c) In how many ways 4 boys and 3 girls be seated in a row so that two girls are together?

(d) Find r if $P(10, r + 1) : P(11, r) = 30 : 11$.

(e) Write the negation of the statement: $p \rightarrow q$.

(f) Use quantifiers to state that the sum of two real numbers is real.

(g) Give an example of a semi group which is not monoid.

(h) In a Boolean algebra B, show that $x + 0 = x$, $\forall x \in B$.

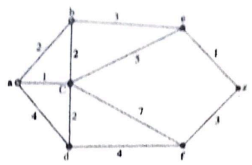
(i) Give an example of a graph which has Euler circuit but not a Hamiltonian circuit.

(j) Draw a connected graph with one of vertex with degree 5.

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SECTION-B

2. Find the shortest distance between a and z in the following graph



3. Find whole numbers x and y so that $44x+17y = 1$ with $x > 10$ using Euclidean algorithm.

4. How many words each of 3 vowels and 2 consonants, can be formed from the letters of the word 'INVOLUTE'?

5. Show that $p \wedge q$ logically implies $p \leftrightarrow q$.

6. Check whether the set of all even integers forms a group under the binary operation $a * b = 2a + 2b$.

SECTION-C

7. State and prove Fundamental theorem of Arithmetic.

8. (a) If $f(x, y, z) = (x \vee y) \wedge (x \vee y') \wedge (x' \wedge z)$ be a Boolean function, find its disjunctive normal form.

(b) Prove that a graph is a tree if and only if it is minimally connected.

9. If p, q, r are three statements, then test the validity of the argument $(S_1, S_2; S)$, where $S_1 : p \rightarrow q$, $S_2 : p \rightarrow r$ and $S : p \rightarrow (q \wedge r)$.

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Total No. of Questions : 09

Total No. of Pages :03

B.Tech. (AI&ML/CSE/ AI & Data Science/AI/CSE/IOT/IT/Data Science/Internet of Things and Cyber Security including Block Chain Technology/) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS/401/18

M.Code : 77626

Date of Examination : 09-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Answer briefly :**

   a) Give an example of a relation which is reflexive, transitive, but not symmetric.

   b) How many people among 200000 people are born at same time (hour, minute, seconds).

   c) How many 8 – letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?

   d) State and Prove Idempotent Laws of Logic Of Proposition.

   e) Define integral domain (I.D).

   f) Find k, if a regular graph with 7 vertices has 12 edges.

   g) Define minimal spanning tree.

   h) Draw a multigraph G whose adjacency matrix $A = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 1 & 2 \\ 0 & 2 & 0 \end{bmatrix}$

   i) Define cut vertex with an example.

   j) Define POSET.

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SECTION-B

2. Show that R is a relation in the set $A = \{x \in Z : 0 \le x \le 12\}$, given by $R = \{(a, b): |a - b|$ is a multiple of 4$\}$. Prove that R is an equivalence relation. Find the set of all elements related to 1 in each case.

3. a) The number of diagonals of a polygon is 20. Find the number f its sides.

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

   b) Test the validity of the following argument:

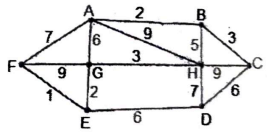
   If my brother stands first in the class, I will give him a watch. Either he stood first or I was out of station. I did not give my brother a watch this time. Therefore I was out of station.

5. Show that if the quotient group G/H is abelian, then G may not be abelian.

6. Prove that the number of edges in a complete graph with n vertices is $\frac{n(n-1)}{2}$.

SECTION-C

7. Use Kruskal algorithm to find spanning tree of minimal weight by showing each step.



8. A subgroup H of a group G is a normal subgroup of G iff the product of two right cosets of H in G is again a right coset of H in G.

9. a) Prove that the function $f: C \to R$, defined by $f(z) = |z|$ is neither one - one nor onto.

b) Let $f: R \to R$ and $g: R \to R$ be a real valued function defined by $f(x) = 2x^3 - 1, x \in R$ and $g(x) = \left[\frac{x+1}{2}\right]^{\frac{1}{3}}, x \in R$. Show that f and g are bijective.

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Total No. of Questions : 09 Total No. of Pages :03

B.Tech. (AI&ML/CSE/ AI & Data Science/AI/CSE/IOT/IT/Data Science/Internet of Things and Cyber Security Including Block Chain Technology/) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS/401/18

M.Code : 77626

Date of Examination : 09-05-2024

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

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   b) How many people among 200000 people are born at same time (hour, minute, seconds).

   c) How many 8 – letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?

   d) State and Prove Idempotent Laws of Logic Of Proposition.

   e) Define integral domain (I.D).

   f) Find k, if a regular graph with 7 vertices has 12 edges.

   g) Define minimal spanning tree.

   h) Draw a multigraph G whose adjacency matrix $A = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 1 & 2 \\ 0 & 2 & 0 \end{bmatrix}$

   i) Define cut vertex with an example.

   j) Define POSET.

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SECTION-B

2. Show that R is a relation in the set $A = \{x \in Z : 0 \le x \le 12\}$, given by $R = \{(a, b): |a - b|$ is a multiple of 4$\}$. Prove that R is an equivalence relation. Find the set of all elements related to 1 in each case.

3. a) The number of diagonals of a polygon is 20. Find the number f its sides.

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

   b) Test the validity of the following argument:

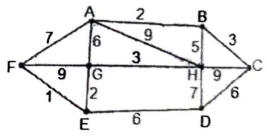
   If my brother stands first in the class, I will give him a watch. Either he stood first or I was out of station. I did not give my brother a watch this time. Therefore I was out of station.

5. Show that if the quotient group G/H is abelian, then G may not be abelian.

6. Prove that the number of edges in a complete graph with n vertices is $\frac{n(n-1)}{2}$

SECTION-C

7. Use Kruskal algorithm to find spanning tree of minimal weight by showing each step.



8. A subgroup H of a group G is a normal subgroup of G iff the product of two right cosets of H in G is again a right coset of H in G.

9. a) Prove that the function $f : C \to R$, defined by $f(z) = |z|$ is neither one - one nor onto.

b) Let $f : R \to R$ and $g : R \to R$ be a real valued function defined by $f(x) = 2x^3 - 1, x \in R$ and $g(x) = \left[\frac{x+1}{2}\right]^{\frac{1}{3}}, x \in R$. Show that f and g are bijective.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/CSE/Data Science/AI/IOT/IT/CS/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly:**

   a) Give an example of a relation which is reflexive, symmetric but not transitive.

   b) Determine the domain and range of the relation $R = \{(x,y) : x \in N, x < 5, y = 3\}$

   c) How many 3- letter words can be made using the letters of the words "ORIENTAL"?

   d) State and Prove Idempotent Laws of Logic of Proposition.

   e) Define Monoid Groups.

   f) Find k, if a regular graph with 8 vertices has 12 edges.

   g) Define minimal spanning tree.

   h) Give an example of a connected graph that has both Euler circuit and Hamiltonian cycle.

   i) Define Chromatic Number.

   j) Define Equivalent Sets.

SECTION-B

2. Let Z be the set of all integers and R be the relation on Z defined as $R = \{(a,b) : a,b \in Z$ and $(a - b)$is divisible by $5\}$. Prove that R is an equivalence relation.

3. a) How many people must you have to guarantee that at least 12 of them will have birthday on the same day of the week?

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \leftrightarrow q) \leftrightarrow r \equiv p \leftrightarrow (q \leftrightarrow r)$

   b) Prove the validity of the following argument:

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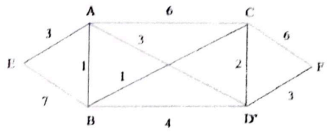
      ii) It did not rain therefore the crop will not be good.

5. Prove that the order of a subgroup of a finite group divides the order of the group.

6. Show that a graph is a tree if and only if it is minimally connected.

SECTION-C

7. Find shortest path from E to F using Dijkstra's algorithm for the following graph:



8. Show that the set $G = \{0,1,2,3,4\}$ forms a field w.r.t addition and multiplication modulo 5.

9. a) Give an example of a function (i) which is one to one but not onto, (ii) which is not one to one but onto.

   b) Define the following function on integers by:

   $$f(k) = k + 1, g(k) = 2k \text{ and } h(k) = \left\lfloor \frac{k}{2} \right\rfloor$$

   i) Which of these are one to one?

   ii) Which of these are onto?

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Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (AI&ML/CSE/Data Science/AI/IOT/IT/CS/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly:**

   a) Give an example of a relation which is reflexive, symmetric but not transitive

   b) Determine the domain and range of the relation R = {(x,y) : x ε N,x < 5 ,y = 3}

   c) How many 3- letter words can be made using the letters of the words "ORIENTAL"?

   d) State and Prove Idempotent Laws of Logic of Proposition.

   e) Define Monoid Groups.

   f) Find k, if a regular graph with 8 vertices has 12 edges.

   g) Define minimal spanning tree.

   h) Give an example of a connected graph that has both Euler circuit and Hamiltonian cycle.

   i) Define Chromatic Number.

   j) Define Equivalent Sets.

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SECTION-B

2. Let Z be the set of all integers and R be the relation on Z defined as R = {(a,b) a,b ε Z and (a – b)is divisible by 5}. Prove that R is an equivalence relation

3. a) How many people must you have to guarantee that at least 12 of them will have birthday on the same day of the week?

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \leftrightarrow q) \leftrightarrow r \equiv p \leftrightarrow (q \leftrightarrow r)$.

   b) Prove the validity of the following argument :

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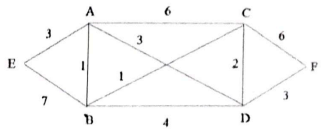
      ii) It did not rain therefore the crop will not be good.

5. Prove that the order of a subgroup of a finite group divides the order of the group.

6. Show that a graph is a tree if and only if it is minimally connected.

SECTION-C

7. Find shortest path from E to F using Dijkstra's algorithm for the following graph.



8. Show that the set G = {0,1,2,3,4} forms a field w.r.t addition and multiplication modulo 5.

9. a) Give an example of a function (i) which is one to one but not onto, (ii) which is not one to one but onto.

   b) Define the following function on integers by

   $$f(k) = k + 1,\ g(k) = 2k \text{ and } h(k) = \left\lfloor \frac{k}{2} \right\rfloor$$

   i) Which of these are one to one?

   ii) Which of these are onto?

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Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (AI&ML/CSE/Data Science/AI/IOT/IT/CS/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 08-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
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SECTION-A

1. **Write briefly:**

a) Give an example of a relation which is reflexive, symmetric but not transitive

b) Determine the domain and range of the relation $R = \{(x,y) : x \in N, x < 5, y = 3\}$

c) How many 3- letter words can be made using the letters of the words "ORIENTAL"?

d) State and Prove Idempotent Laws of Logic of Proposition

e) Define Monoid Groups.

f) Find k, if a regular graph with 8 vertices has 12 edges.

g) Define minimal spanning tree.

h) Give an example of a connected graph that has both Euler circuit and Hamiltonian cycle.

i) Define Chromatic Number.

j) Define Equivalent Sets.

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SECTION-B

2. Let Z be the set of all integers and R be the relation on Z defined as $R = \{(a,b) : a,b \in Z$ and $(a - b)$ is divisible by $5\}$. Prove that R is an equivalence relation.

3. a) How many people must you have to guarantee that at least 12 of them will have birthday on the same day of the week?

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \leftrightarrow q) \leftrightarrow r \equiv p \leftrightarrow (q \leftrightarrow r)$.

   b) Prove the validity of the following argument :

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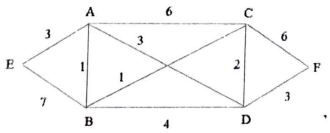
      ii) It did not rain therefore the crop will not be good.

5. Prove that the order of a subgroup of a finite group divides the order of the group.

6. Show that a graph is a tree if and only if it is minimally connected.

SECTION-C

7. Find shortest path from E to F using Dijkstra's algorithm for the following graph



8. Show that the set $G = \{0,1,2,3,4\}$ forms a field w.r.t addition and multiplication modulo 5.

9. a) Give an example of a function (i) which is one to one but not onto, (ii) which is not one to one but onto.

   b) Define the following function on integers by

$$f(k) = k + 1,\ g(k) = 2k \text{ and } h(k) = \left\lceil \frac{k}{2} \right\rceil$$

   i) Which of these are one to one?

   ii) Which of these are onto?

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Total No. of Questions : 18

Total No. of Pages : 03

B.Tech. (Artificial Intelligence & Machine Learning/ Computer Engineering / Computer Science & Engineering / Information Technology/ CSE (Internet of Things and Cyber Security Including Block Chain Technology/Artificial Intelligence & Machine Learning)) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Answer briefly :

1. Give an example of a relation which is reflexive but neither symmetric nor transitive.
2. Determine the domain and range of the relation R = $\{(x, y) : x \in N, y \in N \text{ and } x+y = 10\}$
3. How many 8- letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?
4. Define permutation groups.
5. Write down the truth table of $(p \leftrightarrow q) \leftrightarrow r$.
6. Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
7. Define a complete binary tree.
8. Give an example of a connected graph that has an Euler circuit but no Hamiltonian circuit.
9. What will be the chromatic number of complete graph with n - vertices?

10. Define equivalent sets.

SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.
12. The set C* of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.
13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.

    b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.

14. a) Prove that $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$

    b) Prove the validity of the following argument:

    If a man is bachelor, he is happy.

    If a man is happy, he dies young.

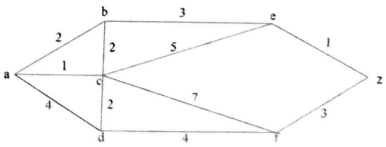
    Therefore bachelors die young.

15. Show that a graph G with n vertices and $(n - 1)$ edges and no circuit is connected.

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SECTION C

16. Find the shortest path between a and z using Dijkstra's algorithm for the following graph:



17. a) Prove that every finite integral domain is a field.

    b) Simplify the Boolean expression $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge z)$. And find its conjunctive normal forms.

18. A function f is defined on the set of integers as follows:

$$f(x)=\begin{cases}1+x & 1\le x<2\\ 2x-1 & 2\le x<4\\ 3x-10 & 4\le x<6\end{cases}$$

a) Find the domain of the function.

b) Find the range of the function.

c) Find the value of $f(4)$.

d) State whether f is one - one or many one function.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (Artificial Intelligence & Machine Learning/ Computer Engineering / Computer Science & Engineering / Information Technology/ CSE (Internet of Things and Cyber Security Including Block Chain Technology/Artificial Intelligence & Machine Learning)) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Answer briefly :

1. Give an example of a relation which is reflexive but neither symmetric nor transitive.
2. Determine the domain and range of the relation R = $\{(x, y) : x \in N.\ y \in N$ and $x+y = 10\}$
3. How many 8- letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?
4. Define permutation groups.
5. Write down the truth table of $(p \leftrightarrow q) \leftrightarrow r$.
6. Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
7. Define a complete binary tree.
8. Give an example of a connected graph that has an Euler circuit but no Hamiltonian circuit.
9. What will be the chromatic number of complete graph with n - vertices?
10. Define equivalent sets.

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SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.
12. The set C* of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.
13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.

    b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.
14. a) Prove that $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$

    b) Prove the validity of the following argument:

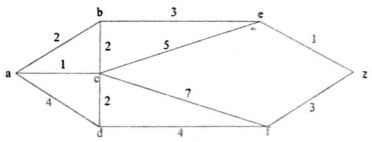
    If a man is bachelor, he is happy.

    If a man is happy, he dies young.

    Therefore bachelors die young.
15. Show that a graph G with n vertices and $(n-1)$ edges and no circuit is connected.

SECTION C

16. Find the shortest path between a and z using Dijkstra's algorithm for the following graph:



17. a) Prove that every finite integral domain is a field.

    b) Simplify the Boolean expression $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge z)$. And find its conjunctive normal forms.

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