GOVERNMENT COLLEGE FOR WOMEN (A), KUMBAKONAM

DEPARTMENT OF COMPUTER SCIENCE – I M.Sc (COMPUTER SCIENCE)

MATHEMATICAL FOUNDATION - MULTIPLE CHOICE QUESTIONS

SUBCODE: P21CSC101

UNIT – I

1) If x is a set and the set contains an integer which is neither positive nor negative then the set x is \_\_\_\_\_\_\_\_\_\_\_\_.

1. Set is Empty b. Set is Non-empty
2. Set is Finite d. Set is both Non- empty and Finite.

Answer: d) Set is both Non- empty and Finite.

Explanation: The non-empty and finite set is set {0}.

2) If x ∈ N and x is prime, then x is \_\_\_\_\_\_\_\_ set.

1. Infinite set b. Finite set
2. Empty set d. Not a set

Answer: a) Infinite set

Explanation: There is no extreme prime, so the number of primes is infinite.

3) Which of the following is a subset of set {1, 2, 3, 4}?

1. {1, 2} b. {1, 2, 3}
2. {1} d. All of the mentioned

Answer: d) All of the mentioned

Explanation: The subset of set (1, 2, 3, 4} is {1, 2}, {1, 2, 3}, and {1}.

4) Power set of empty or Null set has exactly \_\_\_\_\_\_\_\_\_ subset.

1. One b. Two
2. Zero d. Three

Answer: a) One

Explanation: The power set of the Null set has exactly one subset, which is an empty set.

5) What is the Cartesian product of set A and set B, if the set A = {1, 2} and set B = {a, b}?

1. { (1, a), (1, b), (2, a), (b, b) } b. { (1, 1), (2, 2), (a, a), (b, b) }
2. { (1, a), (2, a), (1, b), (2, b) } d. { (1, 1), (a, a), (2, a), (1, b) }

Answer: c) { (1, a), (2, a), (1, b), (2, b) }

Explanation: A subset R of the Cartesian product AxB is a relation from the set A to the set B.

6) The members of the set S = {x | x is the square of an integer and x < 100} is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. {0, 2, 4, 5, 9, 55, 46, 49, 99, 81} b. {1, 4, 9, 16}
2. {0, 1, 4, 9, 16, 25, 36, 49, 64, 81} d. {0, 1, 4, 9, 25, 36, 49, 123}

Answer: c) {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}

Explanation: The set S contains the square of an integer less than 10. That's why the third option is correct according to the given set.

7) The intersection of the sets {1, 2, 8, 9, 10, 5} and {1, 2, 6, 10, 12, 15} is the set \_\_\_\_\_\_\_\_\_\_\_\_\_

1. {1, 2, 10} b. {5, 6, 12, 15}
2. {2, 5, 10, 9} d. {1, 6, 12, 9, 8}

Answer: a) {1, 2, 10}

Explanation: The intersection of the two sets is the set that contains the common elements of both the given sets. That's why the first option is right according to the given sets.

8) The difference of {1, 2, 3, 6, 8} and {1, 2, 5, 6} is the set \_\_\_\_\_\_\_\_\_\_\_\_

1. {1, 3} b. {5, 6, 8}
2. {3, 8} d. {2, 6, 5}

Answer: c) {3, 8}

Explanation: The 'difference of the sets A and B' (A-B) is the set that contains the elements that are in set A but not in set B.

9) Which option contains two equal sets?

1. X = {5, 6} and Y = {6} b. X = {5, 6, 8, 9} and Y = {6, 8, 5, 9}
2. X = {5, 6, 9} and Y = {5, 6} d. X = {5, 6} and Y = {5, 6, 3}

Answer: b) X = {5, 6, 8, 9} and Y = {6, 8, 5, 9}

Explanation: The second option is true because both X and Y sets have the same elements.

10) The cardinality of the Power set of the set {1, 5, 6} is\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. 5 b. 6
2. 8 d. 10

Answer: c) 8

Explanation: The power set of the any set is the set of all its subset. So, P({1, 5, 6}) = {null, {1}, {5}, {6}, {1, 5}, {1,6}, {5, 6}, {1, 5, 6}}. The power set of the given set consists of 8 elements. That's why, 8 is the cardinality of the given set.

11) Which of the following function is not a mathematics function?

1. many to one b. one-to-many
2. one to one d. All of the mentioned

Answer: b) one-to-many

Explanation: None

12) Which of the following function is also referred to as an injective function?

1. Many-to-one b. Onto

c. One-to-One d. None of the mentioned

Answer: c) One-to-One.

Explanation: An injective function or one-to-one function is a function that connects a single element of domain to the single element of co-domain.

13) The function (gof) is \_\_\_\_\_\_\_\_\_, if the function f and g are onto function?

1. Into function b. one to one function
2. onto function d. one-to-many function

Answer: c) onto

Explanation: The function (gof) is also an '"Onto function" if the function f and g are '"Onto function'.

14) If X = {2, 8, 12, 15, 16} and Y= {8, 16, 15, 18, 9} then union of X and Y is\_\_\_\_\_\_\_\_\_\_\_.

1. {2, 8, 12, 15, 16} b. { 8, 16, 15}
2. {8, 16, 15, 18, 9} d. {2, 8, 9, 12, 15, 16, 18}

Answer: d) {2, 8, 9, 12, 15, 16, 18}

Explanation: From both the given sets X and Y, 8, 16, and 15 should be taken once because these elements are common to both sets. So the correct union of X and Y is {2, 8, 9, 12, 15, 16, 18}.

15) How many relations exist from set X to set Y if the set X and set Y has 7 and 8 elements?

1. 256 b. 272
2. 356  d. 56

Answer : a) 256

16) The number of reflexive closure of the relation {(0,1), (1,1), (1,3), (2,1), (2,2), (3,0)} on the set {0, 1, 2, 3} is\_\_\_\_\_\_\_\_.

1. 36 b. 8
2. 6 d. 26

Answer: c) 6

17) The number of transitive closure exists in the relation R = {(0,1), (1,2), (2,2), (3,4), (5,3), (5,4)} where {1, 2, 3, 4, 5} ∈ A is\_\_\_\_\_\_\_\_\_\_.

1. {(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)} b. {(0,0), (4,4), (5,5), (1,1), (2,2), (3,3)}
2. {(0,1), (1,2), (2,2), (3,4)} d. {(0,1), (5,3), (5,4), (1,1), (2,2)}

Answer: a) {(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)}

18) Which statement is incorrect if X and Y are the two non-empty relations on the set S.

1. If X and Y are transitive, then the intersection of X and Y is also transitive.
2. If X and Y are reflexive, then the intersection of X and Y is also reflexive.
3. If X and Y are symmetric, then the union of X and Y is not symmetric.
4. If X and Y are transitive, then the union of X and Y is not transitive.

Answer: d) If X and Y are transitive, then the union of X and Y is not transitive.

19) Which option is the negation of the bits "1001011"?

1. 11011011 b. 10110100

c. 0110100 d. 1100100

Answer: c) 0110100

Explanation: The negation of the given bits is the opposite value of the bits. If the value of a bit is 1 then its negation value is 0. And, if the value of a bit is 0, then its negation value is 1. That's why the negation of "1001011" is "0110100".

20) Which of the following Law of Boolean proofs the X.X=X?

1. Identity Law b. Double Complement Law

c. Complement Law d. Idempotent Law

Answer: d) Idempotent Law.

Explanation: Idempotent Law proofs AND form and OR form. It proofs X+X=X and X.X=X.

21) Which of the following matrix having only one column and multiple rows?

1. Diagonal Matrix b. Row Matrix

c. Column Matrix d. None of the mentioned

Answer: c) Column Matrix.

Explanation: A column matrix is a matrix that consists of one column and multiple rows. The order of the row matrix is N x 1, where N is the number of rows of a column matrix.

22) Universal logic gate is\_\_\_\_\_\_\_\_\_\_.

a. OR b. NOT

c. NAND d. AND

Hide Answer Workspace

Answer: c) NAND

Explanation: NAND is a logic gate that can easily implement or create all the other logic gates without the help of three basic logic gates.

23) Canonical forms for a boolean expression has \_\_\_\_\_\_\_ types.

1. Three types b. Four types

c. Two types d. Five types

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Answer: c) Two types.

Explanation: Canonical Form for a boolean expression has two types. The first form is a product of max-terms, and another form is the sum of min-terms.

24) Boolean algebra deals with how many values.

a. It deals with only four discrete values. b. It deals with only five discrete values.

c. It deals with only three discrete values. d. It deals with only two discrete values.

Answer: d) It deals with only two discrete values.

Explanation: Boolean algebra deals with only two discrete values, 0 and 1. 0 means false, and one means true.

25) The compound propositions p and q are called logically equivalent if \_\_\_\_\_\_\_\_ is a tautology.
a) p ↔ q b. p → q
c) ¬ (p ∨ q) d) ¬p ∨ ¬q
View Answer

Answer: a
Explanation: Definition of logical equivalence.

26) p → q is logically equivalent to \_\_\_\_\_\_\_\_
a) ¬p ∨ ¬q b) p ∨ ¬q
c) ¬p ∨ q d) ¬p ∧ q
View Answer

Answer: c
Explanation: (p → q) ↔ (¬p ∨ q) is tautology.

27) p ∨ q is logically equivalent to \_\_\_\_\_\_\_\_
a) ¬q → ¬p b) q → p
c) ¬p → ¬q d) ¬p → q
Answer: d
Explanation: (p ∨ q) ↔ (¬p → q) is tautology.

28) The symbolization for a conjunction is...

a) p → q b) *p & q*

*c)* p v q d) ~ *p*

Answer: B

29) In a disjunction, even if one of the statements is false, the whole disjunction is still...

a) False b) Negated
c) True d) Both true and false

Answer: C

30) A conditional is symbolized like this…

a) . *p* v *q*  b) *p* → *q*
c) *p \* q* d) *p* & *q*

Answer: B

31. If A is any statement, then which of the following is a tautology?
a) A ∧ F
b) A ∨ F
c) A ∨ ¬A
d) A ∧ T
Answer: c
Explanation: A ∨ ¬A is always true.

32. If A is any statement, then which of the following is not a contradiction?
a) A ∧ ¬A
b) A ∨ F
c) A ∧ F
d) None of mentioned
Answer: b
Explanation: A ∨ F is not always false.

33. A compound proposition that is neither a tautology nor a contradiction is called a \_\_\_\_\_\_\_\_\_\_\_
a) Contingency
b) Equivalence
c) Condition
d) Inference
Answer: a
Explanation: Definition of contingency.

34. ¬ (A ∨ q) ∧ (A ∧ q) is a \_\_\_\_\_\_\_\_\_\_\_
a) Tautology
b) Contradiction
c) Contingency
d) None of the mentioned
Answer: b
Explanation: ≡ (¬A ∧ ¬q) ∧ (A ∧ q)
≡ (¬A ∧ A) ∧ (¬q ∧ q)
≡ F ∧ F ≡ F.

35The NAND statement is a combination of \_\_\_\_\_\_\_\_.

1. NOT and AND
2. NOT and OR
3. AND and OR
4. NOT or OR

Answer: a

36. The NOR statement is a combination of \_\_\_\_\_\_\_\_.

1. NOT and AND
2. NOT and OR
3. AND and OR
4. NOT or OR

Answer: b

37. The contrapositive of p → q is the proposition of \_\_\_\_\_\_\_\_\_\_\_\_
a) ¬p → ¬q
b) ¬q → ¬p
c) q → p
d) ¬q → p
Answer: b
Explanation: Definition of contrapositive.

38. The inverse of p → q is the proposition of \_\_\_\_\_\_\_\_\_\_\_\_
a) ¬p → ¬q
b) ¬q → ¬p
c) q → p
d) ¬q → p
Answer: a
Explanation: Definition of inverse.

39. The converse of p → q is the proposition of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) ¬p → ¬q
b) ¬q → ¬p
c) q → p
d) ¬q → p
Answer: c
Explanation: Definition of converse.

40. What is the contrapositive of the conditional statement? “The home team misses whenever it is drizzling?”
a) If it is drizzling, then home team misses
b) If the home team misses, then it is drizzling
c) If it is not drizzling, then the home team does not misses
d) If the home team wins, then it is not drizzling
Answer: d
Explanation: q whenever p contrapositive is ¬q → ¬p.

41. What is the converse of the conditional statement “If it ices today, I will play ice hockey tomorrow.”
a) “I will play ice hockey tomorrow only if it ices today.”
b) “If I do not play ice hockey tomorrow, then it will not have iced today.”
c) “If it does not ice today, then I will not play ice hockey tomorrow.”
d) “I will not play ice hockey tomorrow only if it ices today.”
Answer: a
Explanation: If p, then q has converse q → p.

42. What are the contrapositive of the conditional statement “I come to class whenever there is going to be a test.”
a) “If I come to class, then there will be a test.”
b) “If I do not come to class, then there will not be a test.”
c) “If there is not going to be a test, then I don’t come to class.”
d) “If there is going to be a test, then I don’t come to class.”
Answer: b
Explanation: q whenever p, has contrapositive ¬q → ¬p.

43. What are the inverse of the conditional statement “ A positive integer is a composite only if it has divisors other than 1 and itself.”
a) “A positive integer is a composite if it has divisors other than 1 and itself.”
b) “If a positive integer has no divisors other than 1 and itself, then it is not composite.”
c) “If a positive integer is not composite, then it has no divisors other than 1 and itself.”
d) None of the mentioned
Answer: c
Explanation: p only if q has inverse ¬p → ¬q.

44. What are the converse of the conditional statement “When Raj stay up late, it is necessary that Raj sleep until noon.”
a) “If Raj stay up late, then Raj sleep until noon.”
b) “If Raj does not stay up late, then Raj does not sleep until noon.”
c) “If Raj does not sleep until noon, then Raj does not stay up late.”
d) “If Raj sleep until noon, then Raj stay up late.”
Answer: d
Explanation: Necessary condition for p is q has converse q → p.

45. What are the contrapositive of the conditional statement “Medha will find a decent job when she labour hard.”?
a) “If Medha labour hard, then she will find a decent job.”
b) “If Medha will not find a decent job, then she not labour hard.”
c) “If Medha will find a decent job, then she labour hard.”
d) “If Medha not labour hard, then she will not find a decent job.”
Answer: b
Explanation: The statement q when p has its contrapositive as ¬q → ¬p.

46. What are the inverse of the conditional statement “If you make your notes, it will be a convenient in exams.”
a) “If you make notes, then it will be a convenient in exams.”
b) “If you do not make notes, then it will not be a convenient in exams.”
c) “If it will not be a convenient in exams, then you did not make your notes.”
d) “If it will be a convenient in exams, then you make your notes
Answer: b
Explanation: If p then q has inverse ¬p → ¬q.

47. Let P and Q be statements, then P<->Q is logically equivalent to \_\_\_\_\_\_\_\_\_\_
a) P<->~Q
b) ~P<->Q
c) ~P<->~Q
d) None of the mentioned
Answer: c
Explanation: Both of them have same truth table, Hence they are equal.

48. What is the negation of the statement A->(B v(or) C)?
a) A ∧ ~B ∧ ~C
b) A->B->C
c) ~A ∧ B v C
d) None of the mentioned
Answer: a
Explanation: A->P is logically equivalent to ~A v P.

49. The compound statement A-> (A->B) is false, then the truth values of A, B are respectively \_\_\_\_\_\_\_\_\_
a) T, T
b) F, T
c) T, F
d) F, F
Answer: c
Explanation: For implications to be false hypothesis should be true and conclusion should be false.

50. The statement which is logically equivalent to A∧ (and) B is?
a) A->B
b) ~A ∧ ~ B
c) A ∧ ~B
d) ~(A->~B)
Answer: d
Explanation: The truth table of both statements are same.

51. Let P: We give a nice overall squad performance, Q: We will win the match.
Then the symbolic form of “We will win the match if and only if we give a nice overall squad performance.“ is?
a) P v Q
b) Q ∧ P
c) Q<->P
d) ~P v Q
Answer: c
Explanation: If and only if statements are bi-conditionals.

52. Let P, Q, R be true, false true, respectively, which of the following is true?
a) P∧Q∧R
b) P∧~Q∧~R
c) Q->(P∧R)
d) P->(Q∧R)
Answer: c
Explanation: Hypothesis is false, hence statement is true.

53. “Match will be played only if it is not a humid day.” The negation of this statement is?
a) Match will be played but it is a humid day
b) Match will be played or it is a humid day
c) All of the mentioned statement are correct
d) None of the mentioned
Answer: a
Explanation: Negation of P->Q is P∧~Q.

54. Consider the following statements.
A: Raju should exercise.
B: Raju is not a decent table tennis player.
C: Raju wants to play good table tennis.
The symbolic form of “Raju is not a decent table tennis player and if he wants to play good table tennis then he should exercise.” is?
a) A->B->C
b) B∧(C->A)
c) C->B∧A
d) B<->A∧C
Answer: b
Explanation: For conditionals statement (if then), implications are used.

55. The statement (~P<->Q)∧~Q is true when?
a) P: True Q: False
b) P: True Q: True
c) P: False Q: True
d) P: False Q: False
Answer: a
Explanation: For a bi-conditional to be true both inputs should be same.

56. Let P, Q, R be true, false, false, respectively, which of the following is true?
a) P∧(Q∧~R)
b) (P->Q)∧~R
c) Q<->(P∧R)
d) P<->(QvR)
Answer: c
Explanation: For a bi-conditional to be true both inputs should be

57. PCNF is also called \_\_\_\_\_\_\_.

1. sum of product canonical form.
2. product of sum canonical form
3. sum canonical form
4. product canonical form

Answer: b

58. Max-terms of two statements are formed by introducing the connective \_\_\_\_\_\_\_\_\_.

1. disjunction
2. conjunction
3. negation
4. conditional

Answer: a

59.A compound proposition that is neither a tautology nor a contradiction is called a \_\_\_\_\_\_\_\_\_\_\_
a) Contingency
b) Equivalence
c) Condition
d) Inference
Answer: a

60. If a normal form contains all minterms, then it is \_\_\_\_\_\_\_\_.

1. a tautology
2. a contradiction
3. a contingency
4. both A and B

Answer: a

UNIT – II

1. The union of the sets {1, 2, 5} and {1, 2, 6} is the set \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2, 6, 1} b) {1, 2, 5, 6}
c) {1, 2, 1, 2} d) {1, 5, 6, 3}
Answer: b
Explanation: The union of the sets A and B, is the set that contains those elements that are either in A or in B.

2. The intersection of the sets {1, 2, 5} and {1, 2, 6} is the set \_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2} b) {5, 6}
c) {2, 5} d) {1, 6}
Answer: a
Explanation: The intersection of the sets A and B, is the set containing those elements that are in both A and B.

3. Two sets are called disjoint if there \_\_\_\_\_\_\_\_\_\_\_\_\_ is the empty set.
a) Union b) Difference
c) Intersection d) Complement
Answer: c
Explanation: By the definition of the disjoint set.

4. Which of the following two sets are disjoint?
a) {1, 3, 5} and {1, 3, 6} b) {1, 2, 3} and {1, 2, 3}
c) {1, 3, 5} and {2, 3, 4} d) {1, 3, 5} and {2, 4, 6}
Answer: d
Explanation: Two sets are disjoint if the intersection of two sets is the empty set.

5. The difference of {1, 2, 3} and {1, 2, 5} is the set \_\_\_\_\_\_\_\_\_\_\_\_
a) {1} b) {5}
c) {3} d) {2}
Answer: c
Explanation: The difference of the sets A and B denoted by A-B, is the set containing those elements that are in A not in B.

6. The complement of the set A is \_\_\_\_\_\_\_\_\_\_\_\_\_
a) A – B b) U – A
c) A – U d) B – A
Answer: b
Explanation: The complement of the set A is the complement of A with respect to U.

7. The bit string for the set {2, 4, 6, 8, 10} (with universal set of natural numbers less than or equal to 10) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) 0101010101 b) 1010101010
c) 1010010101 d) 0010010101
Answer: a
Explanation: The bit string for the set has a one bit in second, fourth, sixth, eighth, tenth positions, and a zero elsewhere.

8. Let Ai = {i, i+1, i+2, …..}. Then set {n, n+1, n+2, n+3, …..} is the \_\_\_\_\_\_\_\_\_ of the set Ai.
a) Union b) Intersection
c) Set Difference d) Disjoint
Answer: b
Explanation: By the definition of the generalized intersection of the set.

9. If n(A)=n then the number of subset of A is \_\_\_\_\_\_\_\_

a)2n b) n2

c)nn d)3n

Answer: A

10. The set difference of the set A with null set is \_\_\_\_\_\_\_\_\_\_
a) A b) null
c) U d) B
Answer: a
Explanation: The set difference of the set A by the null set denoted by A – {null} is A.

11. The shaded area of figure is best described by? 
a) A‘ (Complement of A) b) B – (A ∩ B) – (C ∩ B)
c) A ∩ C ∩ B d) B’ (Complement of B)
Answer: b
Explanation: The region is difference B with A and C.

12. The relation between sets A, B, C as shown by venn diagram is \_\_\_\_\_\_\_\_\_\_
a) A is subset of B and B is subset of C
b) C is not a subset of A and A is subset of B
c) C is subset of B and B is subset of A
d) None of the mentioned
Answer: c
Explanation: As set C is totally inside set B, set B is totally inside set A.

13. Let set A = {1, 2} and C be {3, 4} then A X B (Cartesian product of set A and B) is?
a) {1, 2, 3, 4} b) {(1, 3),(2, 4)}
c) {(1, 3), (2, 4), (1, 4), (2, 3)} d) {(3, 1), (4, 1)}
Answer: c
Explanation: In set A X B : {(c , d) |c ∈ A and d ∈ B}.

14. If set A has 4 elements and B has 3 elements then set n(A X B) is?
a) 12 b) 14
c) 24 d) 7
Answer: a
Explanation: The total elements in n(A X B) = n(A) \* n(B).

15. If set A has 3 elements then number of elements in A X A X A are \_\_\_\_\_\_\_\_\_\_
a) 9 b) 27
c) 6 d) 19
Answer: b
Explanation: n(A X A X A) = n(A)\* n(A)\* n(A).

16. If a set contains 3 elements then the number of subsets is?
a) 6 b) 3
c) 12 d) 8
Answer: d
Explanation: For elements with n elements the number of subsets are 2n.

17. The set containing all the collection of subsets is known as \_\_\_\_\_\_\_\_\_
a) Subset b) Power set
c) Union set d) None of the mentioned
Answer: b
Explanation: Power set contains all the subsets as its elements.

18. If a set is empty then number of subsets will be \_\_\_\_\_\_\_\_\_
a) 1 b) 2
c) 0 d) 4
Answer: a
Explanation: The set has zero elements so 2o = 1.

19) The Storage Structure which do not survive system crashes are

a) Volatile Storage b) Non-Volatile Storage

c) Stable Storage d) Dynamic Storage

Answer: a

20) The Unit of Storage that can store one or more record in a hash file organization are

a) Buckets b) Disk Pages

c) Block d) Nodes

Answer: a

21) The file Organization that provides very fast access to any arbitrary record of a file is

a) Ordered File b) Unordered File

c) Hashed File d)B-tree

Answer: c

22. The file organization module knows about \_\_\_\_\_\_\_\_\_\_\_\_\_
a) files b) logical blocks of files
c) physical blocks of files d) all of the mentioned
Answer: d

23. Metadata includes \_\_\_\_\_\_\_\_\_\_\_\_\_
a) all of the file system structure b) contents of files
c) both file system structure and contents of files d) none of the mentioned
Answer: c

24 . When in contiguous allocation the space cannot be extended easily?
a) the contents of the file have to be copied to a new space, a larger hole
b) the file gets destroyed
c) the file will get formatted and lost all its data
d) none of the mentioned
Answer: a

25. In the linked allocation, the directory contains a pointer to which block?
I. first block
II. last block
a) I only b) II only
c) Both I and II d) Neither I nor II
Answer: c

26. There is no \_\_\_\_\_\_\_\_\_\_ with linked allocation.
a) internal fragmentation b) external fragmentation
c) starvation d) all of the mentioned
Answer: b

27. What is the major disadvantage with a linked allocation?
a) internal fragmentation b) external fragmentation
c) there is no sequential access d) there is only sequential access
Answer: d

28. What if a pointer is lost or damaged in a linked allocation?
a) the entire file could get damaged b) there would not be any problems
c) only a part of the file would be affected d) none of the mentioned
Answer: a

29. FAT stands for \_\_\_\_\_\_\_\_\_\_\_\_\_
a) File Attribute Transport b) File Allocation Table
c) Fork At Time d) None of the mentioned
Answer: b

30. By using FAT, random access time is \_\_\_\_\_\_\_\_\_\_
a) the same b) increased
c) decreased d) not affected
Answer: c
31. The union of the sets {1, 2, 5} and {1, 2, 6} is the set \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2, 6, 1} b) {1, 2, 5, 6}
c) {1, 2, 1, 2} d) {1, 5, 6, 3}
Answer: b
Explanation: The union of the sets A and B, is the set that contains those elements that are either in A or in B.

32. The intersection of the sets {1, 2, 5} and {1, 2, 6} is the set \_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2} b) {5, 6}
c) {2, 5} d) {1, 6}
Answer: a
Explanation: The intersection of the sets A and B, is the set containing those elements that are in both A and B.

33. Two sets are called disjoint if there \_\_\_\_\_\_\_\_\_\_\_\_\_ is the empty set.
a) Union
b) Difference
c) Intersection
d) Complement
Answer: c
Explanation: By the definition of the disjoint set.

34. Which of the following two sets are disjoint?
a) {1, 3, 5} and {1, 3, 6}
b) {1, 2, 3} and {1, 2, 3}
c) {1, 3, 5} and {2, 3, 4}
d) {1, 3, 5} and {2, 4, 6}
Answer: d
Explanation: Two sets are disjoint if the intersection of two sets is the empty set.

35. The difference of {1, 2, 3} and {1, 2, 5} is the set \_\_\_\_\_\_\_\_\_\_\_\_
a) {1}
b) {5}
c) {3}
d) {2}

Answer: c
Explanation: The difference of the sets A and B denoted by A-B, is the set containing those elements that are in A not in B.

36. The complement of the set A is \_\_\_\_\_\_\_\_\_\_\_\_\_
a) A – B
b) U – A
c) A – U
d) B – A
Answer: b
Explanation: The complement of the set A is the complement of A with respect to U.

37. The bit string for the set {2, 4, 6, 8, 10} (with universal set of natural numbers less than or equal to 10) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) 0101010101
b) 1010101010
c) 1010010101
d) 0010010101
Answer: a
Explanation: The bit string for the set has a one bit in second, fourth, sixth, eighth, tenth positions, and a zero elsewhere.

38. Let Ai = {i, i+1, i+2, …..}. Then set {n, n+1, n+2, n+3, …..} is the \_\_\_\_\_\_\_\_\_ of the set Ai.
a) Union
b) Intersection
c) Set Difference
d) Disjoint
Answer: b
Explanation: By the definition of the generalized intersection of the set.

39. The bit strings for the sets are 1111100000 and 1010101010. The union of these sets is \_\_\_\_\_\_\_\_\_\_\_
a) 1010100000
b) 1010101101
c) 1111111100
d) 1111101010
Answer: d
Explanation: The bit string for the union is the bitwise OR of the bit strings.

40. The set difference of the set A with null set is \_\_\_\_\_\_\_\_\_\_
a) A
b) null
c) U
d) B
Answer: a
Explanation: The set difference of the set A by the null set denoted by A – {null} is A.

41. A \_\_\_\_\_\_\_\_\_\_ is an ordered collection of objects.
a) Relation
b) Function
c) Set
d) Proposition
Answer: c
Explanation: By the definition of set.

42. The set O of odd positive integers less than 10 can be expressed by \_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2, 3}
b) {1, 3, 5, 7, 9}
c) {1, 2, 5, 9}
d) {1, 5, 7, 9, 11}
Answer: b
Explanation: Odd numbers less than 10 is {1, 3, 5, 7, 9}.

43. Power set of empty set has exactly \_\_\_\_\_\_\_\_\_ subset.
a) One
b) Two
c) Zero
d) Three
Answer: a
Explanation: Power set of null set has exactly one subset which is empty set.

44. What is the Cartesian product of A = {1, 2} and B = {a, b}?
a) {(1, a), (1, b), (2, a), (b, b)}
b) {(1, 1), (2, 2), (a, a), (b, b)}
c) {(1, a), (2, a), (1, b), (2, b)}
d) {(1, 1), (a, a), (2, a), (1, b)}
Answer: c
Explanation: A subset R of the Cartesian product A x B is a relation from the set A to the set B.

45. What is the cardinality of the set of odd positive integers less than 10?
a) 10
b) 5
c) 3
d) 20
Answer: b
Explanation: Set S of odd positive an odd integer less than 10 is {1, 3, 5, 7, 9}. Then, Cardinality of set S = |S| which is 5.

46. Which of the following two sets are equal?
a) A = {1, 2} and B = {1}
b) A = {1, 2} and B = {1, 2, 3}
c) A = {1, 2, 3} and B = {2, 1, 3}
d) A = {1, 2, 4} and B = {1, 2, 3}
Answer: c
Explanation: Two set are equal if and only if they have the same elements.

47. The set of positive integers is \_\_\_\_\_\_\_\_\_\_\_\_\_
a) Infinite
b) Finite
c) Subset
d) Empty
Answer: a
Explanation: The set of positive integers is not finite.

48. What is the Cardinality of the Power set of the set {0, 1, 2}?
a) 8
b) 6
c) 7
d) 9
Answer: a
Explanation: Power set P ({0, 1, 2}) is the set of all subsets of {0, 1, 2}. Hence, P({0, 1, 2}) = {null, {0}, {1}, {2}, {0, 1}, {0,2}, {1, 2}, {0, 1, 2}}.

49. The members of the set S = {x | x is the square of an integer and x < 100} is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) {0, 2, 4, 5, 9, 58, 49, 56, 99, 12}
b) {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}
c) {1, 4, 9, 16, 25, 36, 64, 81, 85, 99}
d) {0, 1, 4, 9, 16, 25, 36, 49, 64, 121}
Answer: b
Explanation: The set S consists of the square of an integer less than

50. The postfix form of the expression (A+ B)\*(C\*D- E)\*F / G is?

1. AB+ CD\*E – FG /\*\*
2. AB + CD\* E – F \*\*G /
3. AB + CD\* E – \*F \*G /
4. AB + CDE \* – \* F \*G /

Answer: c

51. Which data structure is needed to convert infix notation to postfix notation?

1. Branch
2. Tree
3. Queue
4. Stack

Answer: d

52. One can convert a binary tree to its mirror image by traversing it in

1. Inorder
2. Preorder
3. Postorder
4. None of the above

Answer:- c

53. For an undirected graph with n vertices and e edges, the sum of degree of each vertex is equal to

1. 2n
2. 2e
3. (e2+1)/2
4. (2n-1)/2

Answer: b

54. The cardinality of the set A = {1, 2, 3, 4, 6} is?
a) 5
b) 6
c) Integer
d) None of the mentioned
Answer: a

Explanation: 5, it is a number of elements in the sets.

55. For two equal sets there \_\_\_\_\_\_\_\_\_\_\_
a) Cardinality is same
b) Cardinality is different
c) May be same or different
d) None of the mentioned
Answer: a

Explanation: Two equal sets should have the same number of elements.

56. If A is a subset of B then \_\_\_\_\_\_\_
a) The cardinality of A is greater than B
b) The cardinality of B is greater than A
c) Can’t say
d) None of the mentioned
Answer: b
Explanation: B contains all the elements of A, as well as other elements.

 57.  If cardinality of (A U B) = cardinality of A+ cardinality of B. This means \_\_\_\_\_\_\_\_\_\_\_\_
a) A is a subset of B
b) B is a subset of A
c) A and B are disjoint
d) None of the mentioned
Answer: c
Explanation: Thus if the cardinality of (A U B) = cardinality of A+ cardinality of B, it means they don’t have any element in common, n(A∩B) = 0.

58. If A is a subset of B and B is a subset of C, then cardinality of A U B U C is equal to \_\_\_\_\_\_\_\_\_\_\_\_
a) Cardinality of C
b) Cardinality of B
c) Cardinality of A
d) None of the mentioned
Answer: a
Explanation: A U B U C = C, since a, b are subsets to C.

 59. . Let C and D be two sets then C – D is equivalent to \_\_\_\_\_\_\_\_\_\_
a) C’ ∩ D
b) C‘∩ D’
c) C ∩ D’
d) None of the mentioned
Answer: c
Explanation: Set C-D will be having those elements which are in C but not in D.

60. 4. In which of the following sets A – B is equal to B – A?
a) A = {1, 2, 3}, B = {2, 3, 4}
b) A = {1, 2, 3}, B = {1, 2, 3, 4}
c) A = {1, 2, 3}, B = {2, 3, 1}
d) A = {1, 2, 3, 4, 5, 6}, B = {2, 3, 4, 5, 1}
Answer: c
Explanation: A- B= B-A = Empty set.

UNIT – III

1. Relations may exist between?
a. objects of the same set b. between objects of two or more sets.
c. Both A and B d. None of the above

Answer = c

2. A binary relation R on a single set A is a subset of?
a. A X A b. A % A
c. A ^ A d. A ? A

Answer = a

3. For two distinct sets, A and B, having cardinalities m and n respectively, the maximum cardinality of a relation R from A to B is ?
a. m+n b. m\*n
c. m^n d. None of the above

Answer = b

4. A relation can be represented using a?
a. Indirected graph b. Pie graph
c. Directed graph d. Line graph

Answer = c

5.The \_\_\_\_\_\_ Relation between sets X and Y is the set X×Y
a. Empty b. Full
c. Identity d. Inverse

Answer = b

6. A relation R on set A is called \_\_\_\_\_\_\_\_\_ if xRy implies yRx.
a. Irreflexive b. Reflexive
c. Anti-Symmetric d. Symmetric

Answer = d

7. The relation R={(a,b),(b,a)} on set X={a,b} is?
a. Irreflexive b. Reflexive
c. Anti-Symmetric d. Symmetric

Answer = a

8. The binary relation {(1,1), (2,1), (2,2), (2,3), (2,4), (3,1), (3,2)} on the set {1, 2, 3} is \_\_\_\_\_\_\_\_\_\_
a. reflective, symmetric and transitive b. irreflexive, symmetric and transitive
c. neither reflective, nor irreflexive but transitive d. irreflexive and antisymmetric

Answer = c

9. Consider the binary relation, A = {(a,b) | b = a – 1 and a, b belong to {1, 2, 3}}. The reflexive transitive closure of A is?
a. {(a,b) | a >= b and a, b belong to {1, 2, 3}}

b. {(a,b) | a > b and a, b belong to {1, 2, 3}}
c. {(a,b) | a <= b and a, b belong to {1, 2, 3}}
d. {(a,b) | a = b and a, b belong to {1, 2, 3}}

Answer = a

10. The time complexity of computing the transitive closure of a binary relation on a set of n elements should be \_\_\_\_\_\_\_\_
a. O(n) b. O(logn)
c. O(n^3) d. O(n^2)

Answer = c

11. A set is an \_\_\_\_\_\_\_\_\_ collection of different elements.
a. unordered b. ordered
c. unordered and ordered d. None of the above

Answer: a
Explanation: A set is an unordered collection of different elements.

12. A set can be written explicitly by listing its elements using?
a. () b. []
c. {} d. " "

Answer: c
Explanation: A set can be written explicitly by listing its elements using set bracket {}.

13. Let R be a symmetric and transitive relation on a set A. Then ?

a. R is reflexive and hence a partial order

b. R is reflexive and hence an equivalence relation

c. R is not reflexive and hence not an equivalence relation

d. None of above

Answer = d

14. The binary relation R = {(0, 0),(1, 1)} on A = {0, 1, 2, 3, } is

a) Reflexive, Not Symmetric, Transitive b) Not Reflexive, Symmetric, Transitive

c) Reflexive, Symmetric, Not Transitive d) Reflexive, Not Symmetric, Not Transitive

Answer: b

15. A set which contains a definite number of elements is called?
a. Proper Subset b. Universal Set
c. Finite Set d. Unit Set

Answer : c
Explanation: A set which contains a definite number of elements is called a finite set.

16. The power set of an empty set is?
a. 0 b. 1
c. 2 d. empty set

Answer : d

17.  A function can not be?
a. one to one b. many to one
c. one to many. d. All of the above

Answer: c
Explanation: A function can be one to one or many to one but not one to many.

18. Composition does not hold?
a. associative property b. commutative property
c. one-to-one function d. Both A and B

Answer: b
Explanation: Composition always holds associative property but does not hold commutative property.

19. Determine the characteristics of the relation aRb if a2 = b2.
a) Transitive and symmetric b) Reflexive and asymmetry
c) Trichotomy, antisymmetry, and irreflexive d) Symmetric, Reflexive, and transitive
View Answer

Answer: d
Explanation: Since, x2 = y2 is just a special case of equality, so all properties that apply to x = y also apply to this case. Hence, the relation satisfies symmetric, reflexive and transitive closure.

20. Hasse diagram are drawn

 a. Partially ordered sets b. Lattices

 c. Boolean algebra d. None of these

Answer = a

21. The set of all finite words over E is denoted by ------?

a. E+ b. E\*

c. E d. E-

Answer = A

22. Let set A = {1, 2} and C be {3, 4} then A X B (Cartesian product of set A and B) is?
a) {1, 2, 3, 4} b) {(1, 3),(2, 4)}
c) {(1, 3), (2, 4), (1, 4), (2, 3)} d) {(3, 1), (4, 1)}
Answer: c
Explanation: In set A X B : {(c , d) |c ∈ A and d ∈ B}.

23. If set A has 4 elements and B has 3 elements then set n(A X B) is?
a) 12 b) 14
c) 24 d) 7
Answer: a
Explanation: The total elements in n(A X B) = n(A) \* n(B).

24. If set A has 3 elements then number of elements in A X A X A are \_\_\_\_\_\_\_\_\_\_
a) 9 b) 27
c) 6 d) 19

Answer: b
Explanation: n(A X A X A) = n(A)\* n(A)\* n(A).

25. Which of the following statements regarding sets is false?
a) A X B = B X A b) A X B ≠ B X A
c) n(A X B) = n(A) \* n(B) d) All of the mentioned
Answer: a
Explanation: The Cartesian product of sets is not commutative.

26. If n(A X B) = n(B X A) = 36 then which of the following may hold true?
a) n(A)=2, n(B)=18 b) n(A)=9, n(B)=4
c) n(A)=6, n(b)=6 d) None of the mentioned
Answer: c
Explanation: n(A) should be equal to n(B) for n(A X B) = n(B x A).

28. Let the sets be A, B, C, D then (A ∩ B) X (C ∩ D) is equivalent to \_\_\_\_\_\_\_\_\_\_
a) (A X C) ∩ (B X D) b) (A X D) U (B X C)
c) (A X C) U ( B X D) d) None of the mentioned
Answer: a
Explanation: (A ∩ B) X (C ∩ D) = (A X C) ∩ (B X D) but in case of unions this is not true.

29. If set A and B have 3 and 4 elements respectively then the number of subsets of set (A X B) is?
a) 1024 b) 2048
c) 512 d) 4096
Answer: d
Explanation: The A X B has 12 elements, then the number of the subset are 2 12 = 4096.

30. If set A X B=B X A then which of the following sets may satisfy?
a) A={1, 2, 3}, B={1, 2, 3, 4} b) A={1, 2}, B={2, 1}
c) A={1, 2, 3}, B={2, 3, 4} d) None of the mentioned
Answer: b
Explanation: For set A X B = B X A, this is possible only when set A = B.

1. The universal relation A x A on A is
	1. an equivalence relation
	2. anti-symmetric
	3. a partial ordering relation
	4. not symmetric and not anti- symmetric

Answer:A

1. "n/m" means that n is a factor of m, then the relation T is
	1. reflexive and symmetric
	2. transitive and symmetric
	3. reflexive, transitive and symmetric
	4. reflexive, transitive and not symmetric

Answer: D

1. If the binary operation \* is defined on a set of ordered pairs of real numbers as (a, b) \* (c, d) = (ad + bc, bd) and is associative, then (1, 2) \* (3, 5) \* (3, 4) equals

A. (74,40)

B. (32,40)

C. (23,11)

D. (7,11)

Answer: A

34. If A = (1, 2, 3, 4). Let ~= {(1, 2), (1, 3), (4, 2)}. Then ~ is

* 1. not anti-symmetric
	2. transitive
	3. reflexive
	4. symmetric

Answer: B

1. A relation on the integers 0 through 4 is defined by : R = {(x, y) : x + y ≤ 2x). Which of the properties listed below applies to this relation?
2. Transitivity
3. Symmetry
4. Reflexivity
5. I only
6. III only
7. I and III
8. II and III

Answer: C

1. A relation over the set S = {x, y, z} is defined by : {(x, x), (x, y), (y, x), (x, z), (y, z), (y, y), (z, z)}. What properties hold for this relation?
	1. Symmetric
	2. Reflexive
	3. Antisymmetric
	4. Anti reflexive

Answer: B

1. The number of equivalence relations of the set (1, 2, 3, 4) is
	1. 4
	2. 15
	3. 16
	4. 24

Answer: A

1. Let x and y are sets and I x I and l y I are their respective cardinalities. It is given that there are exactly 97 functions from x to y. From this one can conclude that

A.│x│ = 1, │y│ = 97

B.│x│ = 97, │y│= 1

C. │x│ = 97, │y│= 97

D.none of these

Answer: A

1. If the binary operation \* is defined on a set of ordered pairs of real numbers as (a, b) \* (c, d) = (ad + bc, bd) and is associative, then

(1, 2) \* (3, 5) \* (3, 4) equals

A. (74,40)

B. (32,40)

C. (23,11)

D. (7,11)

Answer: A

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1. Which of the following statements is false ?
	1. If R is reflexive, then R ∩ R-1≠ φ
	2. R ∩ R-1≠ φ =>R is anti-symmetric.
	3. If R, R' are equivalence relations in a set A, then R ∩ R' is also an equivalence relation in A.
	4. If R, R' are reflexive relations in A, then R - R' is reflexive

Answer: D

1. If R = {(1, 2),(2, 3),(3, 3)} be a relation defined on A= {1, 2, 3} then R . R( = R2) is
	1. R itself

b.. {(1, 2),(1, 3),(3, 3)}

c. {(1, 3),(2, 3),(3, 3)}

d. {(2, 1),(1, 3),(2, 3)}

Answer: C

42. If A = {1, 2, 3} then relation S = {(1, 1), (2, 2)} is

1. symmetric only
2. anti-symmetric only
3. both symmetric and anti-symmetric
4. an equivalence relation

Answer: C

1. Which of the following statements is true?
	1. Every equivalence relation is a partial-ordering relation.
	2. Number of relations form A = {x, y, z} to B= {1, 2} is 64.
	3. Empty relation φ is reflexive
	4. Properties of a relation being symmetric and being ant-symmetric are negative of each other.

 Answer: B

1. A relation R is defined on the set of positive integers as xRy. If 2x + y ≤ 5, the relation R is
	1. reflexive
	2. symmetric
	3. transitive
	4. None of these

Answer: C

1. A Relation R is defined on the set of integers as xRy if (x + y) is even. Which of the following statements is TRUE?
	1. R is not an equivalence relation
	2. R is an equivalence relation having one equivalence class
	3. R is an equivalence relation having two equivalence classes
	4. R is an equivalence relation having three equivalence classes

Answer: C

1. If R be a symmetric and transitvie relation on a set A, then
	1. R is reflexive and hence an equivalence relation
	2. R is reflexive and hence a partial order
	3. R is not reflexive and hence not an equivalence relation
	4. None of these

Answer: D

1. The number of binary relations on a set with n elements is , here n^2 is n square
	1. n2
	2. 2n^2
	3. 2n
	4. None of these

Answer: B

1. If A is a finite set with n elements, then number of elements in the largest equivalence relation of A is
	1. 1
	2. n
	3. n+1
	4. n2

Answer: D

1. If R is an equivalence relation on a set A, then R-1 is
	1. reflexive
	2. symmetric
	3. transitive
	4. all of these

Answer: D

1. If relation R is defined on N by R = ((a, b): a divides b; a, b ∈N). Then R is
	1. reflexive
	2. symmetric
	3. transitive
	4. none of these

Answer: C

1. Relation R is defined on the set N as f(a,b): a, b are both odd), is
	1. reflexive
	2. symmetric
	3. transitive
	4. none of these

Answer: D

1. If P then Q is called \_\_\_\_\_\_\_\_\_ statement
2. Conjunction
3. disjunction
4. conditional
5. bi conditional

 Answer: C

1. A relation R in a set X is symmetric if \_\_\_\_\_\_\_
	1. xRy, yRz => xRz.
	2. xRy
	3. xRy=>yRx
	4. xRx

Answer: C

1. . If R is reflexive, symmetric and transitive then the relation is said to be \_\_\_\_\_\_\_\_.

a. Binary relation

b. Compatibility relation

c. Equivalence relation

d. Partial order relation

Answer: C

1. A function cannot be?
A. one to one
B. many to one
C. one to many.
D. All of the above

Answer: C

Explanation: A function can be one to one or many to one but not one to many.

1. Consider the set A = {1, 2, 3}, the power set of A has …. elements
**A) 23**
B) 22C) 25D) 26

Answer: a

1. The cardinality of the set A = {1, 2, 3, 0, 6, 7, 8, 9} is
A) 7
**B) 8**
C) 6
D) 2

Answer: b

1. A relation means …… on a set S.
A) dual relation
**B) binary relation**
C) reflexive relation
D) symmetric relation

Answer: b

1. A …. is a set S with a relation R on it which is reflexive, anti-symmetric and transitive.
A) equivalent set
B) ordered set
C) implicit set
**D) Partially ordered set**

Answer: d

1. If the number of elements in a set is not finite then the set is called an
A) finite set
B) collective set
**C) Infinite set**
D) arranged set

Answer: c

UNIT – IV

1. A graph is a collection of ?
	1. Row and columns b. Vertices and edges

c. Equations d. None of these

Answer = b

Explanation: A graph contains the edges and vertices

1. The degree of any vertex of graph is ?
	1. The number of edges incident with vertex b. Number of vertex in a graph

c. Number of vertices adjacent to that vertex d. Number of edges in graph

Answer = a

Explanation: The number of edges connected on a vertex v with the self loop counted twice is called the degree of vertex.

1. If for some positive integer k, degree of vertex d(v)=k for every vertex v of the graph G, then G is called ?
	1. K graph b. K-regular graph

c. Empty graph d. All of above

Answer = b

Explanation: A graph in which all vertices are of equal degree is called regular graph.

1. A graph with no edges is known as empty graph. Empty graph is also known as. ?
	1. Trivial graph b. Regular graph

c. Bipartite graph d. None of these

Answer = a

Explanation: Trivial graph is the second name for empty graph.

1. Length of the walk of a graph is ?
	1. The number of vertices in walk W b. The number of edges in walk W

c. Total number of edges in a graph d. Total number of vertices in a graph

Answer = b

Explanation: A walk is defined as finite altering sequence of vertices and edges. No Edges appear more than once but vertex may appear more than once.

1. If the origin and terminus of a walk are same, the walk is known as. ?
	1. Open b. Closed

c. Path d. None of these

Answer = b

Explanation: A walk which begins and ends with same vertex is called closed walk otherwise it is open.

1. A graph G is called a if it is a connected acyclic graph ?
	1. Cyclic graph b. Regular graph

c. Tree d. Not a graph

Answer = c

Explanation: No explanation for this question.

1. Eccentricity of a vertex denoted by e(v) is defined by. ?
	1. max { d(u,v): u belongs to v, u does not equal to v : where d(u,v) is the distance between u&v}
	2. min { d(u,v): u belongs to v, u does not equal to v }
	3. Both A and B
	4. None of these Answer = a

Explanation: The eccentricity E(v) of a vertex V in the graph is the distance from v to the vertex farthest from v in G.

1. Radius of a graph, denoted by rad(G) is defined by. ?
	1. max {e(v): v belongs to V }
	2. min { e(v): v belongs to V}
	3. max { d(u,v): u belongs to v, u does not equal to v }
	4. min { d(u,v): u belongs to v, u does not equal to v } Answer = a

Explanation: the diameter or radius of a graph G is largest distance between two vertices in the graph G.

1. The complete graph K, has different spanning trees?
	1. nn-2 b. n\*n

c. nn d. n2

Answer = a

1. Circle Has…………

 a. No Vertices b. Only 1 Vertex

 c. 8 Vertices d. None of these.

Answer = a

1. A graph is tree if and only if
	1. Is Planar b. Contains a circuit

c. Is minimally d. Is completely connected.

Answer = c

1. In any undirected graph the sum of degrees of all the nodes

 a. Must be even b. Are Twice the number of edges

 c. Must be odd d. Need not be even

Answer = b

1. In a graph if e=[u,v] then u and v are called
	1. Endpoints of e b. Adjacent nodes

c. Neighbors d. All of the Above

Answer = d

1. A Tree is a connected?

a. cyclic undirected graph b. acyclic undirected graph
c. acyclic directed graph d. cyclic directed graph

Answer: b
Explanation: A Tree is a connected acyclic undirected graph.

1. Number of edges incident with the vertex V is called?
a. Degree of a Graph b. Handshaking Lemma

c. Degree of a Vertex d. None of the above

Answer: c
Explanation: Degree of a Vertex − The degree of a vertex V of a graph G (denoted by deg (V)) is the number of edges incident with the vertex V.

1. What is Null Graph?
a. A null graph has no nodes b. null graph has no edges
c. null graph has no odd vertex d. null graph has no even vertex

Answer: b
Explanation: A null graph has no edges.

1. Graph consists of a?
a. non-empty set of vertices b. empty set of vertices
c. Both A and B d. None of the above

Answer : a
Explanation: Graph consists of a non-empty set of vertices or nodes V and a set of edges E.

1. **In an undirected graph the number of nodes with odd degree must be:**
a. odd b. prime
c. even d. zero

Answer: c

1. In a tree between every pair of vertices there is ?

a. Exactly one path b. A self loop

c. Two circuits d. n number of paths

Answer = a

1. A Graph is a set of points called?

a. Node b. Edge

c. Fields d. Lines

Answer =a

1. In a \_\_\_\_\_\_ the vertex set and the edge set are finite set.

a. Finite graph b. bipartite graph

c. infinite graph d.connected graph

Answer=a

23.The tree elements are called \_\_\_\_\_\_\_\_\_\_\_

a.Vertices b.nodes

c.points d.edges

Answer=b

24.An n-vertex graph has \_\_\_\_\_\_\_ edges

a.n2 b.n-1

c.n\*n d.n\*(n+1)/2

Answer=a

25.A Tree is a Connected?

a. Cyclic undirected graph b. Acyclic undirected graph

c. Cyclic directed graph d. Acyclic directed graph

Answer=b

26. The Vertex which is of 0 degree is called?

a. Leaf b. Root

c. Internal node d. None of the above

Answer=b

27. A graph is tree if and only if

a. Is planar b. Contains a circuit

c. Is Minimally d. Is completely connected

Answer= c

28. Suppose V is an isolated vertex in a graph, then the degree of v is

a. 0 b. 1

c. 2 d. 3

Answer= a

29. The Complete graph with four vertices has k edges where k is

a. 3 b. 4

c. 5 d. 6

Answer= d

30. Length of the walk of a graph is

a. The number of vertices in walk W b. The number of edges in walk W

c. Total number of edges in a graph d. Total number of vertices in a graph

Answer=b

 31. An isomorphism of graphs G and H is a bijection f the vertex sets of G and H. Such that any two vertices u and v of G are adjacent in G if and only if \_\_\_\_\_\_\_\_\_\_\_\_
a) f(u) and f(v) are contained in G but not contained in H
b) f(u) and f(v) are adjacent in H
c) f(u \* v) = f(u) + f(v)
d) f(u) = f(u)2 + f(v)2
Answer: b

32. A complete n-node graph Kn is planar if and only if \_\_\_\_\_\_\_\_\_\_\_\_\_
a) n ≥ 6
b) n2 = n + 1
c) n ≤ 4
d) n + 3
Answer: c

33. Every Isomorphic graph must have \_\_\_\_\_\_\_\_ representation.
a) cyclic
b) adjacency list
c) tree
d) adjacency matrix
Answer: d

34. An undirected graph G which is connected and acyclic is called \_\_\_\_\_\_\_\_\_\_\_\_
a) bipartite graph
b) cyclic graph
c) tree
d) forest
Answer: c
Explanation: An undirected graph G which is connected and acyclic is termed as a tree. G contains no cycles and if any edge is added to G a simple cycle is formed.

35. An n-vertex graph has \_\_\_\_\_\_ edges.
a) n2
b) n-1
c) n\*n
d) n\*(n+1)/2
Answer: b

36. What is a star tree?
a) A tree having a single internal vertex and n-1 leaves
b) A tree having n vertices arranged in a line
c) A tree which has 0 or more connected subtrees
d) A tree which contains n vertices and n-1 cycles
View Answer

Answer: a
Explanation: A star tree of order n is a tree with as many leaves as possible or in other words a star tree is a tree that consists of a single internal vertex and n-1 leaves. However, an internal vertex is a vertex of degree at least 2.

37. A polytree is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
a) directed acyclic graph
b) directed cyclic graph
c) bipartite graph
d) connected graph
Answer: a
Explanation: A directed acyclic graph is known as a polytree whose underlying undirected graph is a tree. In other words, a directed tree is a directed graph which would be tree if the directions on the edges were ignored.

38. The tree elements are called \_\_\_\_\_\_\_\_\_\_
a) vertices
b) nodes
c) points
d) edges
Answer: b
Explanation: Every tree element is called a node and the lines connecting the elements are called branches. A finite tree structure has a member that has no superior and is called the “root” Or root node. Nodes that have no child are called leaf nodes.

39. In an n-ary tree, each vertex has at most \_\_\_\_\_\_ children.
a) n
b) n4
c) n\*n
d) n-1
Answer: a
Explanation: An n-ary tree is a rooted tree in which each vertex has at most n children. 2-ary trees are termed as binary trees, 3-ary trees are sometimes called ternary trees.

40. A linear graph consists of vertices arranged in a line.
a) false
b) true
c) either true or false
d) cannot determined
Answer: b
Explanation: A linear graph also known as a path graph is a graph which consists of k vertices arranged in a line, so that vertices from i and i+1 are connected by an edge for i=0,…, k-1.

41.Two labeled trees are isomorphic if \_\_\_\_\_\_\_\_\_\_\_\_
a) graphs of the two trees are isomorphic
b) the two trees have same label
c) graphs of the two trees are isomorphic and the two trees have the same label
d) graphs of the two trees are cyclic
Answer: c
Explanation: The number of labeled trees of k number of vertices is kn-2. Two labeled trees are isomorphic if their graphs are isomorphic and the corresponding points of the two trees have the same labels.

42. A graph which consists of disjoint union of trees is called \_\_\_\_\_\_
a) bipartite graph
b) forest
c) caterpillar tree
d) labeled tree
Answer: b
Explanation: A forest is an undirected acyclic graph in which all the connected components are individual trees. This graph contains a disjoint union of trees.

43. What is a bipartite graph?
a) a graph which contains only one cycle
b) a graph which consists of more than 3 number of vertices
c) a graph which has odd number of vertices and even number of edges
d) a graph which contains no cycles of odd length
Answer: d
Explanation: A graph is called a bipartite graph if and only if it contains no cycle of odd length. Every tree is a bipartite graph and a median graph.

44. Two labeled trees are isomorphic if \_\_\_\_\_\_\_\_\_\_\_\_
a) graphs of the two trees are isomorphic
b) the two trees have same label
c) graphs of the two trees are isomorphic and the two trees have the same label
d) graphs of the two trees are cyclic
Answer: c

45. Topological sorting of a graph represents \_\_\_\_\_\_\_ of a graph.
a) linear probing
b) linear ordering
c) quadrilateral ordering
d) insertion sorting
Answer: b

46. Prefix expression can be evaluated \_\_\_\_\_\_\_\_\_
a) from right to left
b) from left to right
c) from the exact middle
d) from second right element
Answer: b

47. Infix to prefix conversion can be done using \_\_\_\_\_\_\_\_\_\_
a) two queues
b) two stacks
c) one stack and two queues
d) one stack
Answer: b

48. The spanning tree will be maximally acyclic if \_\_\_\_\_\_\_\_\_\_\_\_
a) one additional edge makes a cycle in the tree
b) two additional edges makes a cycle in the tree
c) removing one edge makes the tree cycle free
d) removing two edges make the tree cycle free
Answer: a

49. Length of the walk of a graph is .... ?

a. The number of vertices in walk W

b. The number of edges in walk W

c. Total number of edges in a graph

d. Total number of vertices in a graph

Answer = B

50. If the origin and terminus of a walk are same, the walk is known as... ?

 a. Open

b. Closed

c. Path

d. None of these

Answer = B

51. A graph G is called a ..... if it is a connected acyclic graph

1. Cyclic graph
2. Regular graph
3. Tree
4. Not a graph

Answer = C

52. A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are

1. greater than n–1
2. less than n(n–1)
3. greater than n(n–1)/2
4. less than n2/2

Answer = A

53. In any undirected graph the sum of degrees of all the nodes

1. Must be even
2. Are twice the number of edges
3. Must be odd
4. Need not be even

Answer=B

54. Hasse diagram are drawn

1. Partially ordered sets
2. Lattices
3. Boolean algebra
4. None of these

Answer=A

55. A graph in which all nodes are of equal degree is called

1. Multi graph
2. Non regular graph
3. Regular graph
4. Complete graph

Answer=C

56. If every node u in G is adjacent to every other node v in G, A graph is said to be

1. Isolated
2. Complete
3. Finite
4. Strongly Connected

Answer=B

57. Number of vertices of odd degree in a simple graph is

1. Always even
2. Always odd
3. Either even or odd
4. Always zero

Answer=A

58. A simple graph in which there exists an edge between pair of vertices is called

1. Regular graph
2. Planner graph
3. Euler graph
4. Complete graph

Answer=D

59. A given connected graph G is a Euler graph , if and only if all vertices of G are of

1. Same degree
2. Even degree
3. Odd degree
4. Different degree

Answer=B

60. Every cut set of a connected euler graph

1. No such characterization
2. Atleast three edges
3. An even number of edges
4. An odd number of edges

Answer=C

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UNIT - V

1. The column sum in an incidence matrix for a simple graph is \_\_\_\_\_\_\_\_\_\_
a) depends on number of edges b) always greater than 2
c) equal to 2 d) equal to the number of edges

Answer: c
Explanation: For every edge only the vertices with which it is connected would have the value 1 in the matrix, as an edge connects two vertices sum will always be 2.

1. . What are the dimensions of an incidence matrix?
a) Number of edges\*number of edges c) Number of vertices\*number of vertices

b) Number of edges\*number of vertices d) No. of edges \* (1⁄2 \* no. of vertices)
Answer: b
Explanation: Columns may represent edges and vertices may be represented by the rows.

1. The number of elements in the adjacency matrix of a graph having 7 vertices is \_\_\_\_\_\_\_\_\_\_
a) 7 b) 14
c) 36 d) 49
Answer: d
Explanation: There are n\*n elements in the adjacency matrix of a graph with n vertices.
2. What would be the number of zeros in the adjacency matrix of the given graph?

a) 10 b) 6
c) 16 d) 0

Answer: B

1. For the adjacency matrix of a directed graph the row sum is the \_\_\_\_\_\_\_\_\_ degree and the column sum is the \_\_\_\_\_\_\_\_ degree.
a) in, out b) out, in
c) in, total d) total, out

Answer: B

1. A \_\_\_\_\_\_\_\_\_\_ is an ordered collection of objects.
a) Relation b) Function
c) Set d) Proposition

Answer: c
Explanation: By the definition of set.

1. The set O of odd positive integers less than 10 can be expressed by \_\_\_\_\_\_\_\_\_\_\_\_\_
a) {1, 2, 3} b) {1, 3, 5, 7, 9}
c) {1, 2, 5, 9} d) {1, 5, 7, 9, 11}

Answer: b
Explanation: Odd numbers less than 10 is {1, 3, 5, 7, 9}.

1. Power set of empty set has exactly \_\_\_\_\_\_\_\_\_ subset.
a) One b) Two
c) Zero d) Three

Answer: a
Explanation: Power set of null set has exactly one subset which is empty set.

1. What is the Cartesian product of A = {1, 2} and B = {a, b}?
a) {(1, a), (1, b), (2, a), (b, b)} b) {(1, 1), (2, 2), (a, a), (b, b)}
c) {(1, a), (2, a), (1, b), (2, b)} d) {(1, 1), (a, a), (2, a), (1, b)}

Answer: c
Explanation: A subset R of the Cartesian product A x B is a relation from the set A to the set B.

1. What is the cardinality of the set of odd positive integers less than 10?
a) 10 b) 5
c) 3 d) 20

Answer: b
Explanation: Set S of odd positive an odd integer less than 10 is {1, 3, 5, 7, 9}. Then, Cardinality of set S = |S| which is 5.

1. Which of the following two sets are equal?
a)A = {1, 2} and B = {1} b) A = {1, 2} and B = {1, 2, 3}
c) A = {1, 2, 3} and B = {2, 1, 3} d) A = {1, 2, 4} and B = {1, 2, 3}

Answer: c
Explanation: Two set are equal if and only if they have the same elements.

1. The set of positive integers is \_\_\_\_\_\_\_\_\_\_\_\_\_
a) Infinite b) Finite
c) Subset d) Empty

Answer: a
Explanation: The set of positive integers is not finite.

1. How many fundamental cutsets will be generated for a graph with 'n' number of nodes?
a. n+1 b. n-1
c. n2(n-1) d. n/ n-1

 Answer: b

1. The Number of cut set matrices formed from a graph is?
2. NN-1 b) NN

c) NN+2  d) NN+1

Answer: c

1. For Every tree there will be --------- number of cut set matrices.

a) 1 b) 2
c) 3 d) 4

Answer: a

1. Every isomorphic graph must have \_\_\_\_\_\_ Representation
2. Cyclic b. Adjacency list

c. Tree d. Adjacency matrix

Answer: d

1. How many fundamental cutest will be generated for a graph with n number of nodes?
2. N+1 b) N-1

c) N2(n-1) d) n/n-1

Answer: b

1. According to the linear graph theory the number of possible trees is always equal to the determinant of product of \_\_\_\_\_\_
2. Only complete incident matrix b) Reduced incidence matrix & its transpose

c) Cut-Set Matrix d) Tie-Set Matrix

Answer: b

1. The number of elements in the adjacency matrix of a graph having 6 vertices is \_\_\_\_\_\_\_\_\_\_\_\_
2. 7 b) 14

c) 36 d) 49

Answer: c

1. A graph with all vertices having equal degree is known as a
2. Multi graph b) Regular graph

c) Simple Graph d) Complete Graph

Answer: b

1. In the graph shown below, the direction of the cut-set at node ‘c’ is?

a) downwards b) upwards
c) left d) right

Answer: b

1. Consider the graph shown below. The direction of the cut-set of node ‘a’ is?

a) right b) left
c) upwards d) downwards

Answer: c

1. Consider the graph shown below. The direction of the cut-set at node ‘b’ will be?

a) upwards b) right
c) downwards d) left

Answer: b

1. Graphs are represented using
2. Adjacency tree b) Adjacency linked list
3. Adjacency graph d) Adjacency queue

Answer: b

1. What is the maximum number of possible non zero values in an adjacency matrix of a simple graph with n vertices?

a. (n\*(n-1))/2 b. (n\*(n+1))/2
c. n\*(n-1) d. n\*(n+1)

Answer: c

Explanation: Out of n\*n possible values for a simple graph the diagonal values will always be zero.

1. If a connected Graph (G) contains n vertices what would be the rank of its incidence matrix?
a) n-1 b) values less than n-1 are possible
c) values greater than n are possible d) insufficient Information is given
Answer: a
Explanation: Every column of the incidence matrix may contain only +1 and -1 as non zero entries rank would be less than n.
2. In the following DAG find out the number of required Stacks in order to represent it in a Graph Structured Stack.

a) 1 c) 3
b) 2 d) 4
Answer: c
Explanation: Path ADE, BDE and BCE are possible.
3. The column sum in an incidence matrix for a directed graph having no self loop is \_\_\_\_\_\_\_\_\_\_
a) 0 c) 2
b) 1 d) equal to the number of edges
Answer: a
Explanation: Under every edge column there would be either all 0 values or a pair of -1 and +1 value exists.
4. Incidence matrix and Adjacency matrix of a graph will always have same dimensions?
a) True
b) False
Answer: b
Explanation: For a graph having V vertices and E edges, Adjacency matrix have V\*V elements while Incidence matrix have V\*E elements.
5. A node in a circuit is defined as a

a) closed path c) group of interconnected
b) junction of two or more elements d) open terminal of an elements.
Answer: b

 31. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ separates a particular pair of vertices in a graph.
a) line
b) arc
c) cut
d) flow
Answer: c
Explanation: A cut separates a particular pair of vertices in a weighted undirected graph and has minimum possible weight.

32. What is the minimum number of cuts that a graph with ‘n’ vertices can have?
a) n+1
b) n(n-1)
c) n(n+1)/2
d) n(n-1)/2
Answer: c

33. If a connected Graph (G) contains n vertices what would be the rank of its incidence matrix?
a) n-1
b) values greater than n are possible
c) values less than n-1 are possible
d) insufficient Information is given
Answer: a

34. The column sum in an incidence matrix for a directed graph having no self loop is \_\_\_\_\_\_\_\_\_\_
a) 0
b) 1
c) 2
d) equal to the number of edges
Answer: a

35.  Adjacency matrix of all graphs are symmetric.
a) False
b) True
Answer: a
Explanation: Only undirected graphs produce symmetric adjacency matrices.

36.  Incidence matrix and Adjacency matrix of a graph will always have same dimensions?
a) True
b) False
Answer: b
Explanation: For a graph having V vertices and E edges, Adjacency matrix have V\*V elements while Incidence matrix have V\*E elements.

37. For some sparse graph an adjacency list is more space efficient against an adjacency matrix.
a) True
b) False
Answer: a
Explanation: Space complexity for adjacency matrix is always O(V\*V) while space complexity for adjacency list in this case would be O(V).

38. Time complexity to find if there is an edge between 2 particular vertices is \_\_\_\_\_\_\_\_\_
a) O(V)
b) O(E)
c) O(1)
d) O(V+E)
Answer: a
Explanation: The maximum edges a vertex can have is V-1.

39. Number of vertices with odd degrees in a graph having a eulerian walk is \_\_\_\_\_\_\_\_
a) 0
b) Can’t be predicted
c) 2
d) either 0 or 2
Answer: d
Explanation: If the start and end vertices for the path are same the answer would be 0 otherwise 2.

40. All trees with n vertices consists of n-1 edges.
a) True
b) False
Answer: a
Explanation: A trees is acyclic in nature.

41. Which of the following graphs are isomorphic to each other?

a) fig 1 and fig 2
b) fig 2 and fig 3
c) fig 1 and fig 3
d) fig 1, fig 2 and fig 3
Answer: d
Explanation: All three graphs are Complete graphs with 4 vertices.

42. A graph having an edge from each vertex to every other vertex is called a \_\_\_\_\_\_\_\_\_\_\_
a) Tightly Connected
b) Strongly Connected
c) Weakly Connected
d) Loosely Connected
Answer: a
Explanation: This is a part of the nomenclature followed in Graph Theory.

43. What is the maximum number of possible non zero values in an adjacency matrix of a simple graph with n vertices?

A. (n\*(n-1))/2
B. (n\*(n+1))/2
C. n\*(n-1)
D. n\*(n+1)

Answer : C

44. What is the order of a matrix?

A. number of rows multiplied number of columns
B. number of columns multiplied number of rows
C. number of rows multiplied number of rows
D. number of columns multiplied number of columns

 Answer : A

Explanation: The order of the matrix is the number of rows X number of columns.

45. Which of the following don’t use matrices?
A. In solving linear equations
B. Image processing
C. Graph theory
D. Sorting numbers

Answer: D

46. **The column sum in an incidence matrix for a simple graph is \_\_\_\_\_\_\_\_\_\_**
A) depends on number of edges
B) always greater than 2
C) equal to 2
D) equal to the number of edges

Answer: C

47. If every node u in G is adjacent to every other node v in G, A graph is said to be

1. isolated
2. complete
3. finite
4. strongly connected

Answer: B

48. According to the linear graph theory, the number of possible trees is always equal to the determinant of product of \_\_\_\_\_\_

a. Only complete incidence matrix
b. Reduced incidence matrix & its transpose
c. Cut-Set matrix
d. Tie-set matrix

Answer: B

49.  What will be the value of a rectangular (complete incidence) matrix, if an associated branch is oriented towards the node?

a. 1
b. -1
c. 0
d. Not defined (∞)

Answer: B

**50. What is the direction of the cut-set?**
**a) same as the direction of the branch current**
b) opposite to the direction of the link current
c) same as the direction of the link current
d) opposite to the direction of the branch current
**Answer: a**
51. **For every tree there will be \_\_\_\_\_ number of cut set matrices.**
**a) 1**
b) 2
c) 3
d) 4
**Answer: a**

52. The number of elements in the adjacency matrix of a graph having 9 vertices is \_\_\_\_\_\_\_\_\_\_

1. 9
2. 27
3. 36
4. 81

**Answer: d**

**53.** What are the dimensions of an incidence matrix?

1. Number of edges\*number of edges
2. Number of edges\*number of vertices
3. Number of vertices\*number of vertices
4. None of the mentioned statements

**Answer: b**

**54.** A cut-edge or cut-vertex of a graph is an edge or vertex whose deletion \_\_\_\_\_\_\_\_\_\_\_\_the number of components.

1. Decreases
2. Increases
3. Doesn’t affect
4. None of the mentioned

**Answer: b**

55.Which of the following graph is a simple graph ?

 

Graph A

Graph B

Both Graph A and Graph B

None of the mentioned

**Answer: b**

56. Which of the following is true?
a) A graph may contain no edges and many vertices
b) A graph may contain many edges and no vertices
c) A graph may contain no edges and no vertices
d) A graph may contain no vertices and many edges
Answer: b

57. Which of the following ways can be used to represent a graph?
a) Adjacency List and Adjacency Matrix
b) Incidence Matrix
c) Adjacency List, Adjacency Matrix as well as Incidence Matrix
d) No way to represent
Answer: c

58. Which of the following properties does a simple graph not hold?
a) Must be connected
b) Must be unweighted
c) Must have no loops or multiple edges
d) Must have no multiple edges
Answer: a

59.  How many of the following statements are correct?
i) All cyclic graphs are complete graphs.
ii) All complete graphs are cyclic graphs.
iii) All paths are bipartite.
iv) All cyclic graphs are bipartite.
v) There are cyclic graphs which are complete.
a) 1
b) 2
c) 3
d) 4
Answer: b
60.  What is the number of vertices of degree 2 in a path graph having n vertices,here n>2.
a) n-2
b) n
c) 2
d) 0
Answer: a
Explanation: Only the first and the last vertex would have degree 1, others would be of degree 2.