Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Discrete Mathematics
Course Code - M201

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- Dip.CSE
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- [ ] M.SC.(MSJ)
- [ ] M.SC.(AM)
- [ ] M.SC.CS)
- [ ] M.SC.(ANCS)
- [ ] M.SC.(MM)
- [ ] B.A.(Eng)

Answer all the questions. Each question carry one mark.

9. 1. Let R be a symmetric and transitive relation on a set A. Then

Mark only one oval.

- [ ] R is reflexive and hence a partial order
- [ ] R is reflexive and hence a equivalence relation
- [ ] R is not reflexive and hence a equivalence relation
- [ ] None of these

10. 2. Two finite sets have m and n element respectively. The total number of subsets of first set is 112 more than the total number of sub sets of the second set The value of m and n respectively are

Mark only one oval.

- 5, 2
- 4, 7
- 7, 4
- 2, 5

11. 3. How many symmetric relations are possible on a set with n elements?

Mark only one oval.

- 2n (n+1) / 2
- 2n(n - 1)
- 2n
- 2n+2

12. 4. The number of elements in the power set of the set {a, b} is

Mark only one oval.

- 2
- 4
- 6
- 8

13. 5. For all odd integer a, gcd(3a,3a+2)=

Mark only one oval.

- 1
- 2
- 3
- None of these

14. 6. If A is symmetric as well as skew- symmetric then A is a/an

Mark only one oval.

- Diagonal matrix
- Null matrix
- Identity matrix
- None of these

15. 7. If A is a nth order square matrix, then det(5A)=

Mark only one oval.

- 5[det(A)]n
- 5[det(A)]
- 5n[det(A)]n
- 5n[det(A)]

16. 8. If A and B are non-singular square matrices, then (AB)-1=

Mark only one oval.

- A-1 B-1
- AB-1
- A-1 B
- B-1 A-1

17. 9. A statement T is called tautology if

Mark only one oval.

- T is true for all possible values of its variables
- T is false for all values of its variables
- T is true as well as false for few possible values of its variables
- None of these

18. 10. Let P:If Sahil bowls, Saurabh hits a century. ,Q: If Raju bowls , Sahil gets out on first ball. Now if P is true and Q is false then which of the following can be true?

Mark only one oval.

- Raju bowled and Sahil got out on first ball
- Raju did not bowled
- Sahil bowled and Saurabh hits a century
- Sahil bowled and Saurabh got out

19. 11. The number of three digit number that can be formed from the digits 1,3,5,7 is,

Mark only one oval.

- 24
- 6
- 4
- none of these

20. 12. If n pigeonholes are occupied by n+1 pigeons, then at least _____ number of hole is occupied by more than one pigeon.

Mark only one oval.

- 2
- 1
- 3
- None of these

21. 13. The least number of people 4 of whom will have same birthday of the week is,

Mark only one oval.

- 18
- 42
- 28
- 22

22. 14. The number of ways in which 6 different flowers can be arranged in a garland is

Mark only one oval.

- 120
- 60
- 240
- None of these

23. 15. The number of distinct permutations that can be formed from all the letters of the word UNUSUAL is

Mark only one oval.

- 5040
- 840
- 210
- 35

24. 16. The minimum number of students needed to guarantee that 4 of them belong to the same class (1st year, 2nd year, 3rd year and 4th year) is

Mark only one oval.

- 16
- 15
- 13
- 11

25. 17. The Fibonacci sequence is

Mark only one oval.

- 0,1,2,3,5,8……..
- 0,1,2,3,4,5,…..
- 1,1,2,3,5,8,……..
- 0,-1,3,-6,10,……..

26. 18. A minimally connected graph is a

Mark only one oval.

- Binary tree
- Hamiltonian graph
- Tree
- Regular graph

27. 19. If G is a tree with n vertices, then the number of edges of G are

Mark only one oval.

- n
- (n-1)
- n(n+1)
- n(n-1)

28. 20. An edge whose two end vertices coincide is called

Mark only one oval.

- ring
- adjacent edge
- loop
- none of these

29. 21. If the origin and terminus of a walk coincide then it is a

Mark only one oval.

- path
- open walk
- circuit
- closed walk

30. 22. A self-loop cannot be included in a

Mark only one oval.

- walk
- circuit
- trail
- path

31. 23. A tree is a

Mark only one oval.

- any connected graph
- minimally connected graph
- Euler graph
- none of these

32. 24. Each vertex (except one) of a binary tree has degree

Mark only one oval.

- 1 or 2
- 2 or 3
- 1 or 3
- 2 or 4

33. 25. Addition of an edge between any two vertices of a tree creates

Mark only one oval.

- Euler line
- Circuit
- Longest path
- Regular graph

34. 26. The minimum number of pendant vertices in a tree with five vertices is

Mark only one oval.

- 1
- 2
- 3
- 4

35. 27. To make a graph (with e edges and n vertices) free from any circuit the minimum number of edges to be removes from G in

Mark only one oval.

- e-n
- e-n+1
- n-1
- e-1

36. 28. A graph with no circuit and no parallel edges is called

Mark only one oval.

- Multi graph
- Pseudo graph
- Simple graph
- None of these

37. 29. A graph G has a spanning tree iff G is

Mark only one oval.

- regular
- connected
- simple
- tree

38. 30. If a graph has 6 vertices and 15 edges then the size of its adjacency matrix is

Mark only one oval.

- 6X6
- 6X15
- 15X6
- 15X15

39. 31.

If $X \cup \{3,4\} = \{1,2,3,4,5,6\}$ then which of the following is true

Mark only one oval.

- Smallest set X= {1,2,5,6}
- Smallest set X= {1,2,3,5,6}
- Smallest set X= {1,2,3,4}
- Greatest set X= {1,2,3,4}

40. 32.

If set A is empty set then $n\left[P\left[P\left[P(A)\right]\right]\right] =$

Mark only one oval.

- 6
- 16
- 2
- 4

41. 33.

A and B are two sets n(A-B) = 8 + 2x, n(B-A) = 6x and n(A∩B)=x If n(A) = n(B) then n(A∩B) =

Mark only one oval.

- 26
- 50
- 24
- None of these

42. 34. Let R be a reflexive relation of a finite set A having n elements and let there

Mark only one oval.

- m>=n
- m<=n
- m=n
- none of these

43. 35.

Let R be the real line consider the following subsets of the plane $R \times R$, $S = \{(x,y): y = x+1 \text{ and } 0 < x < 2\}$, $T = \{(x,y): x - y \text{ is an integer}\}$, which of the following is true?

Mark only one oval.

- T is an equivalence relation on R but S is not.
- Neither S nor T is an equivalance relation on R
- Both S and T are equivalence relations on R
- S is an equivalence relation on R but T is not

44. 36. If A is the set of even natural numbers less then 8 and B is the set of prime numbers less than 7, then the number of relations from A to B is

Mark only one oval.

- 2^9
- 9^2
- 3^2
- 2^9 - 1

45. 37.

For $m, n \in N$, $n \mid m$ means that n is a factor of m, the relation $\mid$ is

Mark only one oval.

- Reflexive and symmetric
- Transitive and symmetric
- Reflexive, transitive and symmetric
- Reflexive, transitive and not symmetric

46. 38.

Given the relation $R=\{(a,b),(b,c)\}$ in the set $A=\{a,b,c\}$ then the minimum number of ordered pairs which added to R make it an equivalence relation is

Mark only one oval.

- 5
- 6
- 7
- 8

47. 39.

If S is defined on R by $(x,y)\in S \Leftrightarrow xy\geq 0$ then S is

Mark only one oval.

- An equivalence relation
- Reflexive only
- Symmetric only
- Transitive only

48. 40.

Let $f(x)=\sec x+\tan x$ and $g(x)=\dfrac{\tan x}{1-\sec x}$

(i) g is odd function
(ii) f is neither an odd function nor an even function

Mark only one oval.

- (i) is true
- (ii) is true
- (i) and (ii) both are true
- (i) and (ii) both are false

49. 41.

The value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega^2 & 1 & \omega \\ \omega^2 & \omega & 1 \end{vmatrix}$ is .

Mark only one oval.

- 0
- 1
- 2
- 3

50. 42.

If the matrix $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & \lambda \end{pmatrix}$ is singular then the value of λ is

Mark only one oval.

- 2
- 3
- 4
- 5

51. 43.

If $A=\begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix}$, then $A^2+7I=$

Mark only one oval.

- 0
- 2A
- 3A
- 5A

52. 44. Trace of a square null matrix is

Mark only one oval.

- 1
- 0
- infinite
- none of these

53. 45. The statement [~p v (p → q)] → ~p is a _____.

Mark only one oval.

- Tautology
- Contingency
- Contradiction
- None of these

54. 46.

"$\forall x \in \mathbb{R}$ such that $x^2 = 4$" is equivalent to

Mark only one oval.

If x is real number then $x^2 = 4$

- Option 1
- Some real numbers have square 4
- Square of no real number is 4
- None of these

55. 47.

Let $P(x)$ states "x is wealthy" and $Q(x)$ states "x is married". Domain is "all men", then $\exists x P(x)$ is

Mark only one oval.

- All men are wealthy
- At least one man is wealthy
- No man is wealthy
- None of these

56. 48.

If ${}^{2n}C_3 : {}^{n}C_2 = 44:33$ then the value of n is

Mark only one oval.

- 6
- 5
- 2
- 7

57. 49.

If ${}^{n}C_1$, ${}^{n}C_2$ and ${}^{n}C_3$ are in A.P., the value of n is

Mark only one oval.

- 6
- 7
- 8
- 4

58. 50.

The number of non-negative integral solutions of the inequality $x_1 + x_2 + x_3 < 10$, $x_1, x_2, x_3 \geq 0$ is

Mark only one oval.

- 1320
- 220
- 110
- none of these

59. 51.

The solution of the recurrence relation $a_n = 2a_{n-1} + 1$, with $a_0 = 1$

Mark only one oval.

- 2^n
- 2^n - 2
- 2^n + 1
- 2^n - 1

60. 52.

Determine the value of a2 for the recurrence relation $a_n = 17a_{n-1} + 30n$ with $a_0 = 3$.

Mark only one oval.

- 4387
- 5484
- 238
- 1437

61. 53. Suppose G is the generating function for the sequence 4, 7, 10, 13, 16, 19,..., the find a generating function (in terms of G) for the sequence of differences between terms.

Mark only one oval.

- (1-x)G-4/x
- (1-x)G-4/x^3
- (1-x)G+6/x
- (1-x)G-x^2

62. 54.

Find the sequence generated by $1/1-x^2-x^4$., assume that 1, 1, 2, 3, 5, 8,... has generating function $1/1-x-x^2$.

Mark only one oval.

- 0, 0, 1, 1, 2, 3, 5, 8,...
- 0, 1, 2, 3, 5, 8,...
- 1, 1, 2, 2, 4, 6, 8,...
- 1, 4, 3, 5, 7,...

63. 55. An one-to-one function is known as

Mark only one oval.

- injective function
- surjective function
- bijective function
- None of these

64. 56.

A and B are two sets $n(A-B) = 8 + 2x$, $n(B-A) = 6x$ and $n(A \cap B) = x$ If $n(A) = n(B)$ then $n(A \cap B) =$

Mark only one oval.

- 26
- 50
- 24
- none of these

65. 57.

The truth value of the statement $x^2 = x$ holds for all real values of x is

Mark only one oval.

- T
- F
- T or F
- neither T nor F

66. 58. In how many ways 7 different beads can be arranged to form a necklace?

Mark only one oval.

- 250
- 350
- 360
- 300

67. 59.

If ${}^{2n}C_3 :^{n} C_2 = 44:33$ then the value of n is

Mark only one oval.

- 6
- 5
- 2
- 7

68. 60. The number of words of 5 different letters that can be formed by taking 2 letters from the word BOX and 3 letters from the word TABLE is

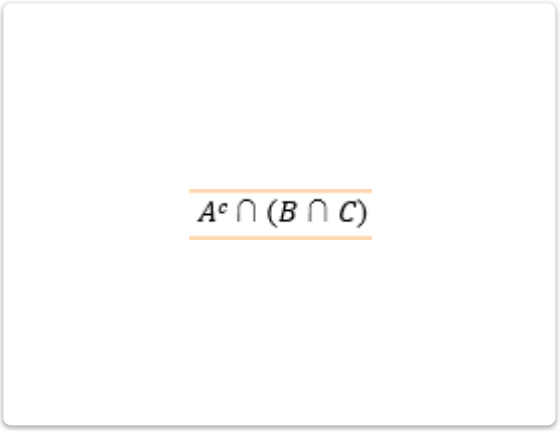
Mark only one oval.

- 120
- 30
- 3600
- None of these

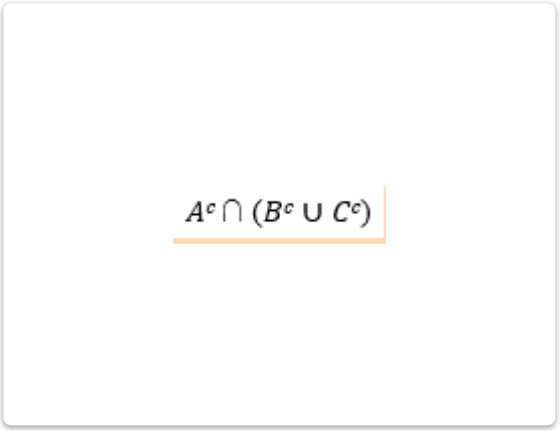
69. 61.

According to De-Morgan's law $[A \cup (B \cap C)]^c$

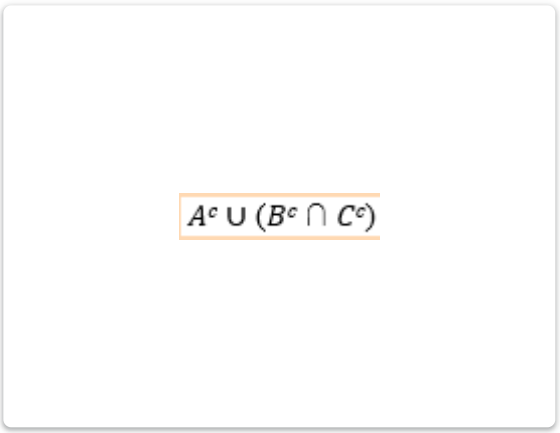
Mark only one oval.



Option 1



Option 2



Option 3

none of these

70. 62.

If $S = \{\emptyset\}$ then power set of S is _____.

Mark only one oval.

{Ø}

Option 1

ø

Option 2

{Ø,{Ø}}

Option 3

none of these

71. 63. Out of the following the singleton set (whose cardinality is one) is

Mark only one oval.

$A = \{ x : 3x^2 - 27 = 0 , x \in Q \}$

Option 1

$B = \{ x : x^2 - 1 = 0 , x \in R \}$

Option 2

$C = \{ x : 30x - 59 = 0 , x \in N \}$

Option 3

$D = \{ x : x^2 - 1 = 0 , x \in N \}$

Option 4

72. 64.

If A and B are sets and $A \cup B = A \cap B$, then

Mark only one oval.

- A = Φ
- B = Φ
- A = B
- none of these

73. 65. A survey shows that 70% of the Indian like mango wheres 82% like apple. If x% of Indian like both mango and apples then

Mark only one oval.

X = 52

$52 \leq x \leq 70$

Option 2

X = 70

$70 \leq x \leq 82$

Option 4

74. 66.

Given the function $f(x)=\frac{3^x+3^{-x}}{2}$ then $f(x+y)+f(x-y)=$

Mark only one oval.

- f(x) + f(y)
- Option 2
- f(x) / f(y)
- 2 f(x) f(y)

75. 67.

The inverse of the matrix $\begin{pmatrix} 2 & 1 \\ 4 & 2 \end{pmatrix}$

Mark only one oval.

Option 1: $\begin{pmatrix} 2 & -1 \\ -4 & 2 \end{pmatrix}$

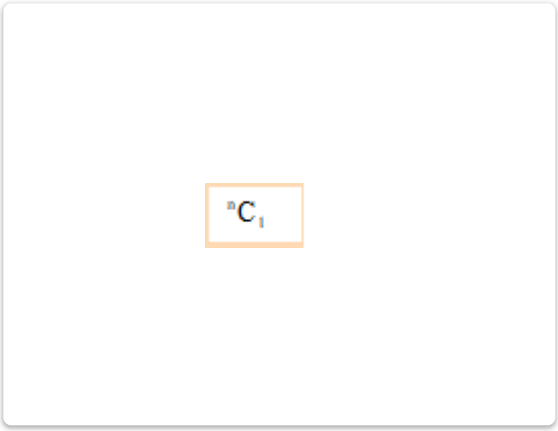
Option 2: $\begin{pmatrix} 2 & -4 \\ -1 & 2 \end{pmatrix}$

Option 3: $\begin{pmatrix} -2 & 4 \\ -3 & 6 \end{pmatrix}$

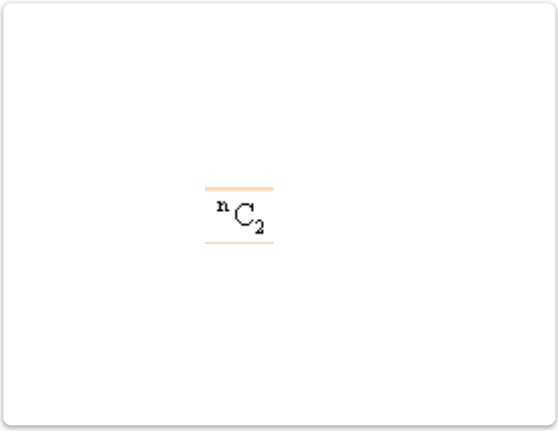
does not exist

76. 68. Number of edges in a complete graph with n-vertices is:

Mark only one oval.



Option 1



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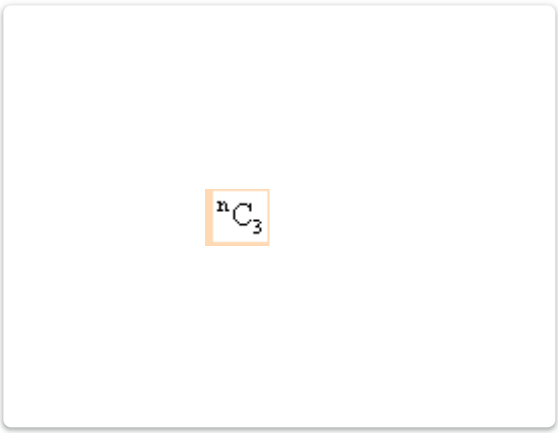

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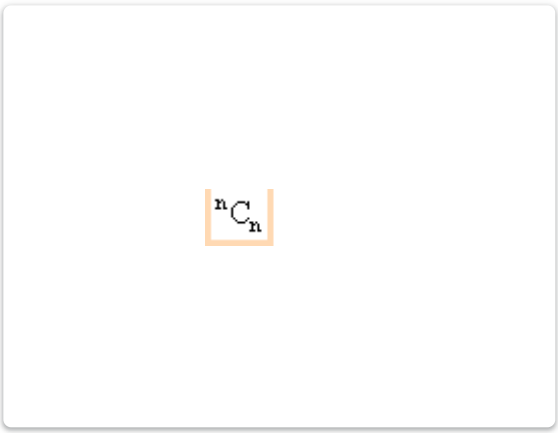

Option 4

77. 69.

$(AB)^T =$

Mark only one oval.

A^T+B^T

Option 1

A^TB^T

Option 2

$B^T A^T$

Option 3

none of these

78. 70.

If $p \leftrightarrow q \equiv (p \rightarrow q) \wedge r$, then r is

Mark only one oval.

$p \rightarrow q$

Option 1

$\neg p$

Option 2

$q \rightarrow p$

Option 3

$\neg q$

Option 4