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

Course Name - –Discrete Mathematics
Course Code -PCC-CS404

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Answer all the questions. Each question carry one mark.

9.   1.

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

Mark only one oval.

$A^c \cap (B \cap C)$

◯ Option 1

$A^c \cap (B^c \cup C^c)$

◯ Option 2

$A^c \cup (B^c \cap C^c)$

◯ Option 3

◯ none of these

◯ Option 5

10.   2. An one-to-one function is also known as

Mark only one oval.

◯ injective function

◯ surjective function

◯ bijective function

◯ None of these

11.   3. Two finite sets have m and n element respectively. The total number of subsets of first set is 2 times the total number of sub sets of the second set. Then the possible values of m and n respectively are

Mark only one oval.

◯ 5, 2

◯ 4, 7

◯ 7, 6

◯ 2, 5

12.   4. The relation { (1,2), (1,3), (3,1), (1,1), (3,3), (3,2)} on {1, 2, 3, 4} is

Mark only one oval.

◯ Reflexive

◯ Symmetric

◯ Transitive

◯ Asymmetric

13.   5.

Which is the correct statement about the function $f:Z \rightarrow Z$ defined by $f(x) = 2x$?
Mark only one oval.

$f(x)$ is one-to-one and onto

$f(x)$ is one-to-one but not onto

○ Option 1

○ Option 2

$f(x)$ is not one-to-one but onto

$f(x)$ is neither one-to-one nor onto

○ Option 3

○ Option 4

14.   6.How many reflexive relations are possible on a set with n elements?

Mark only one oval.

○ 2n (n+1) / 2

○ 2n(n - 1)

○ 2n

○ 2n+2

15.   7.

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

Mark only one oval.

$\{\emptyset\}$

Option 1

$\emptyset$

Option 2

$\{\emptyset, \{\emptyset\}\}$

Option 3

None of above

16.   8.Out of the following the singleton set (whose cardinality is one) is

Mark only one oval.

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

Option 1

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

Option 2

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

Option 3

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

Option 4

17.   9.

If A and B are sets and A∪ B= A ∩ B, then

Mark only one oval.

$A = \Phi$

○ Option 1

$B = \Phi$

○ Option 2

$A = B$

○ Option 3

○ none of these

18.   10. The number of elements in the power set of the set {a, b} is

Mark only one oval.
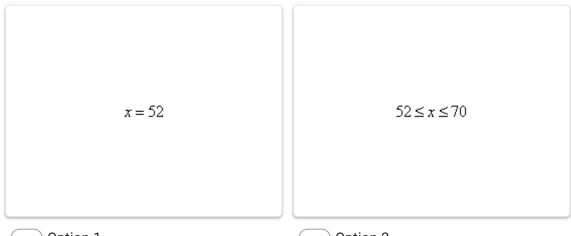
○ 2

○ 4

○ 6

○ 8

19.   11. A survey shows that 70% of the Indian like mango wheres 82% like apple. If x%
        of Indian like both mango and apples, then
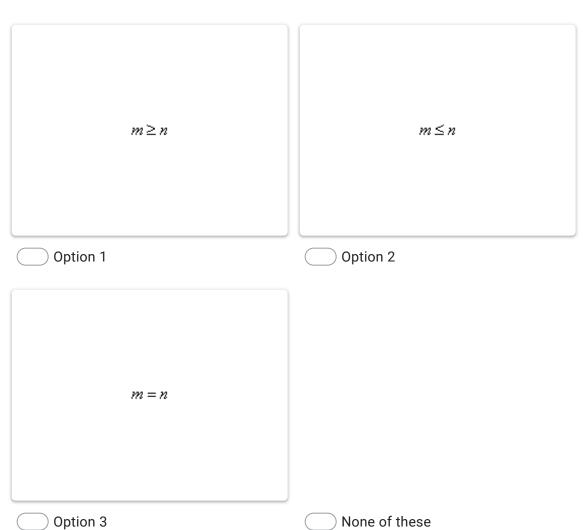
Mark only one oval.

$x = 52$

Option 1

$52 \le x \le 70$

Option 2

$70 \le x \le 82$

Option 3

$x = 70$

Option 4

20.   12.

The class $[-11]$ in Z_3 is equal to

Mark only one oval.

○ [1]

○ [4]

○ [0]

○ None of these

21.   13.Which of the following is a countably infinite set?

Mark only one oval.

⬭ Z

⬭ R

⬭ {2}

⬭ No such set exist

22.   14.Two positive integers are said to be relatively prime if

Mark only one oval.

⬭ there product is a prime number

⬭ both are prime numbers

⬭ there lcm is a prime number

⬭ there gcd is 1

23. 15. Let R be a reflexive relation of a finite set A having n elements and let therebe m ordered pairs in R. Then

Mark only one oval.

$m \geq n$

Option 1

$m \leq n$

Option 2

$m = n$

Option 3

None of these

24. 16. The product of two countably infinite set is

Mark only one oval.

○ finite

○ countably infinite

○ uncountable

○ either countably infinite or uncountable

25.   17. The number of even prime is

Mark only one oval.

◯ 1

◯ 2

◯ 0

◯ infinitely many

26.   18.

The domain of the function f, where $f(x) = \dfrac{1}{|x|+1}$ is

Mark only one oval.

◯ R

◯ R\{1}

◯ R\{-1,1}

◯ None of these

27.   19.

The number of relation from a set of m elements to a set of n elements is

Mark only one oval.

$$mn$$

○ Option 1

$$2^{mn}$$

○ Option 2

$$2^{m+n}$$

○ Option 3

○ None of these

28.   20.

Let R be the relation over the set $N \times N$ and is defined by
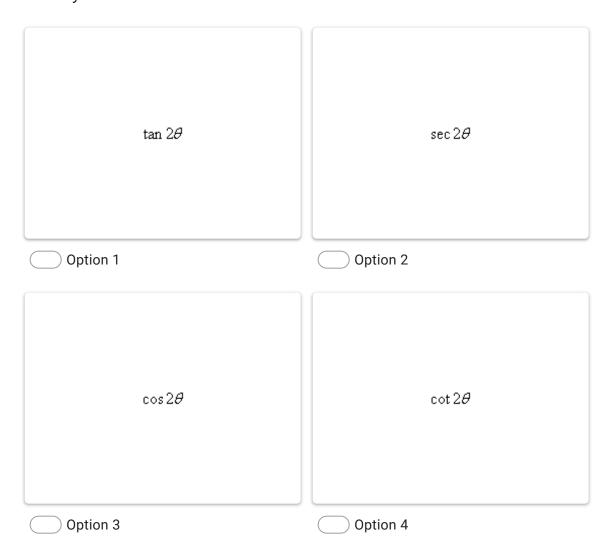$(a,b) R(c,d) \Rightarrow a+d = b+c$ then R is

Mark only one oval.

◯ Reflexive only

◯ Symmetric only

◯ Transitive only

◯ An equivalence relation

29.   21. Which of the following is a partially ordered relation on A= {1, 2, 3}?

Mark only one oval.

◯ {(1,2), (2,2)}

◯ {(1,2), (2,3), (3,2)}

◯ {(1, 1), (1, 2), (2,1)}

◯ None of these

30.　22.

If $f(x) = \dfrac{1-x}{1+x}$　then　$f(f(\cos 2\theta)) =$

Mark only one oval.

$\tan 2\theta$

○ Option 1

$\sec 2\theta$

○ Option 2

$\cos 2\theta$

○ Option 3

$\cot 2\theta$

○ Option 4

31.   23.

The inverse of $\dfrac{7^x - 7^{-x}}{7^x + 7^{-x}}$ is

Mark only one oval.

$\dfrac{1}{2}\log_7 \dfrac{1+x}{1-x}$

Option 1

$\log_7 \dfrac{1-x}{1+x}$

Option 2

$\log_{\frac{1}{2}} \dfrac{1-x}{1+x}$

Option 3

$\dfrac{1}{2}\log_e \dfrac{1+x}{1-x}$

Option 4

32.   24. For all odd integer a, gcd(3a,3a+2)=

Mark only one oval.

1

2

3

None of these

33.   25. The number of committees of 2 boys and 3 girls that can be formed out of 7
       boys and 6 girls is

       Mark only one oval.

       ◯ 21

       ◯ 20

       ◯ 420

       ◯ 50400

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

       Mark only one oval.

       ◯ 250

       ◯ 300

       ◯ 360

       ◯ 720

35.   27. A farmer buys 3 cows, 2 pigs, and 4 hens from a man who has 6 cows, 5 pigs,
       and 8 hens. The number m of choices that the farmer has:

       Mark only one oval.

       ◯ 2000

       ◯ 14000

       ◯ 200

       ◯ 1400

36. 28.

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

37. 29.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

38. 30.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

39.   31. Find the number m of committees of 5 with a given chairperson that can be selected from 12 people.

Mark only one oval.

○ 495

○ 3960

○ 4950

○ None of these

40.   32. Find the number of ways a coin can be tossed 6 times so that there is exactly 3 heads and no two heads occur in a row.

Mark only one oval.

○ 22

○ 20

○ 7

○ None of these

41. 33.

Negation of $\exists x \forall y, p(x,y)$ is

Mark only one oval.

$\forall x \exists y, \neg p(x,y)$	$\exists x \exists y, \neg p(x,y)$
◯ Option 1	◯ Option 2

$\forall x \forall y, p(x,y)$	
◯ Option 3	◯ magnetic disk

42. 34. Every vertex of a null graph is
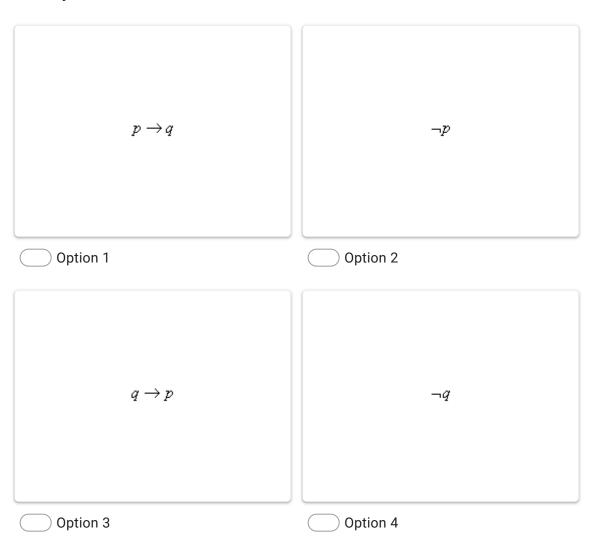
Mark only one oval.

◯ Pendant

◯ Isolated

◯ Odd

◯ none of these

43.   35. If p:"anil is rich" and q:"kanchan is poor" then the symbolic from the statement "Either Anil or Kanchan is rich" is

Mark only one oval.

$p \vee q$

○ Option 1

$p \vee \neg q$

○ Option 2

$\neg p \vee q$

○ Option 3

$\neg (p \vee q)$

○ Option 4

44.   36.

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

Mark only one oval.

$$p \rightarrow q$$

$$\neg p$$

⬭ Option 1   ⬭ Option 2

$$q \rightarrow p$$

$$\neg q$$

⬭ Option 3   ⬭ Option 4

45.   37. 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

46.   38. Let P: We should be honest., Q: We should be dedicated .,R: We should be overconfident.Then 'We should be honest or dedicated but not overconfident.' is best represented by

Mark only one oval.

- ⬭ ~P V ~Q V R
- ⬭ P ∧ ~Q ∧ R
- ⬭ P V Q ∧ R
- ⬭ P V Q ∧ ~R

47.   39.

"$\forall x \in \mathbb{R}$ 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

48.   40.

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

49.   41.

Inverse of "$\neg p \to q$" is

Mark only one oval.

$$p \to q$$

○ Option 1

$$\neg p \to \neg q$$

○ Option 2

$$p \to \neg q$$

○ Option 3

$$\neg q \to \neg p$$

○ Option 4

50. 42.

$p \rightarrow q$ is logically equivalent to

Mark only one oval.

$\neg p \lor \neg q$

Option 1

$p \lor \neg q$

Option 2

$\neg p \lor q$

Option 3

$\neg p \land q$

Option 4

51.   43.

If $P(n):1+3+5+...+(2n-1)=n^2$ is

Mark only one oval.

true for $n>1$

true $\forall n \in N$

○ Option 1   ○ Option 2

true for no n

none of these

○ Option 3   ○ Option 4

52.   44.The degree of an isolated vertex is

Mark only one oval.

○ 0

○ 1

○ 2

○ none

53.   45. By induction hypothesis, the series 12 + 22 + 32 + ... + p2 can be proved
       equivalent to

Mark only one oval.

$$\frac{p(p+1)}{2}$$

$$\left(\frac{p(p+1)}{2}\right)^2$$

○ Option 1   ○ Option 2

$$\frac{p(p+1)}{4}$$

$$\frac{p(p+1)(2p+1)}{6}$$

○ Option 3   ○ Option 4

54.   46.

Let * be a binary operation on a non-empty set S. Then $(S,*)$ is called a

Mark only one oval.

○ groupoid

○ semi-group

○ monoid

○ group

55.   47.

If $(G,.)$ is a group with identity e such that $a^2 = e$, $\forall a \in G$, then G is

Mark only one oval.

◯ an abelian group

◯ a non-abelian group

◯ non-associative

◯ none of these

56.   48. A complete graph must be a

Mark only one oval.

◯ circuit

◯ regular graph

◯ non-simple graph

◯ null-graph

57.   49. The degree of the common vertex of two edges in series is

Mark only one oval.

◯ 0

◯ 1

◯ 2

◯ may be more than 2 .

58.   50. A simple graph has

Mark only one oval.

◯ no parallel edges

◯ no loops

◯ no parallel edges and no loops

◯ no isolated vertex

59.   51. A tree is a

Mark only one oval.

◯ any connected graph

◯ minimally connected graph

◯ Euler graph

◯ none .

60.   52. A binary tree has exactly

Mark only one oval.

◯ two vertices of degree 2

◯ one vertex of degree 2

◯ one vertex of degree 1

◯ one vertex of degree 3 .

61.   53.Sum of the degrees of all vertices of a binary tree is even if the tree has

Mark only one oval.

- ⬭ odd no of vertices
- ⬭ even no of vertices
- ⬭ four vertices
- ⬭ none of these .

62.   54. A tree always is a

Mark only one oval.

- ⬭ self complement graph
- ⬭ Euler graph
- ⬭ simple graph
- ⬭ Hamiltonian graph .

63.   55. Dijkstra's algorithm is used to

Mark only one oval.

- ⬭ find maximum flow in a network
- ⬭ to scan all vertices of a graph
- ⬭ find the shortest path from a specified vertex to another
- ⬭ none of these

64.   56. The minimum number of pendant vertices in a tree with five vertices is

Mark only one oval.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4

65.   57.Which of the following statement is true?

Mark only one oval.

- ◯ A spanning tree is a super graph of G
- ◯ A spanning tree is a subgraph of G
- ◯ A spanning tree may not be a tree at all
- ◯ G may not have a spanning tree

66.   58. In a graph if e=[u, v], Then u and v are called

Mark only one oval.

- ◯ Endpoints of e
- ◯ Neighbors
- ◯ Adjacent nodes
- ◯ Endpoints of e, Neighbors & Adjacent nodes

67.   59.A graph G has a spanning tree iff G is

Mark only one oval.

◯ regular

◯ connected

◯ simple

◯ tree

68.   60.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

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