DISCRETE MATHEMATICS

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

2. If A = {1,3,5} and B = {1,3,5,7} then A is a .... subset of B
A) smaller
B) proper
C) improper
D) normal

3. Consider the set A = {1, 2, 3}, the power set of A has .... elements
A) 2^3
B) 2^2
C) 2^5
D) 2^6

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

5. If A is the arithmetic mean between the extremes a and b then A =
A) a – b / 2
B) a + b / 2
C) a + 2b / 2
D) a – 2b / 2

6. The nth term of an arithmetic progression a + (a + d) + (a + 2d) + …. is
A) a + nd
B) a + (n–1)d
C) a + (n+1)d
D) 2a + (n+1)d

7. The proposition ~p ν (p ν q) is a
A) Tautology
B) Contradiction
C) Logical equivalence
D) None of the above

8. The sum to infinity of a geometric progression is
A) a / 1 – r
B) a / 1 + r
C) - a / 1 + r
D) a^2 / 1 + r

9. Combinatorics is the branch of discrete mathematics concerned with ....
A) counting problems
B) abstract algebra
C) derivative problems
D) integrated problems

10. If the object A is chosen in m ways and B in n ways then either A or B is chosen in .... ways
A) m/n
B) mn
C) m + n
D) m – n

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

12. 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

13. If S is a poset and a, b are in S such that a > b and there is no c in S such that a > c and c > b, then we say that .....
A) b covers b
B) a covers a
C) a covers b
D) b covers a

14. Let (A,*) be an algebraic system where * is a binary operation on A. Then (A,*) is called a semigroup if it satisfies the
A) closure law
B) associative law
C) reflexive law
D) closure and associative law

15. Let N be the set of natural numbers, under the operation '*', where x*y = max (x,y). Then the set is a
A) topogroup
B) multigroup
C) semigroup
D) subgroup

16. The set Z with the binary operation "subtraction" is …... a subgroup
A) not
B) subset of
C) always
D) superset of

17. If for any ring R, a.b = b.a for all a, b∈R then R is said to be a .....
A) integer ring
B) commutative ring
C) cyclic ring
D) non-commutative ring

18. A commutative ring is said to be an integral domain if it has no .....
A) zero-divisors
B) inverse
C) multiples
D) identity

19. A ring R is said to be a ….... if $x^2 = x$ for all x∈R.
A) permutation ring
B) commutative ring
C) Boolean ring
D) identity ring

20. If R is a Boolean ring then R is a .....
A) commutative ring
B) subring
C) integral ring
D) integer

21. Reasoning is a special kind of thinking called .....…
A) inferring
B) logics
C) bijective
D) contradictive

22. The basic unit of our objective language is called a .....
A) prime divisor
B) prime statement
C) bijective statement
D) statement

23. The validity of an argument does not guarantee the truth of the .....
A) permutation
B) commutative value
C) conclusion
D) identity value

24. A ..... is a statement that is either true or false, but not both.
A) argument
B) conclusion
C) bi-conditional
D) proposition

25. A function f: A → B is said to be ..... if for every yÎB there exists at least one element xÎA such that f(x) = y.
A) surjective
B) bijective
C) injective
D) Automorphism

26. If f is onto then f(A) =
A) Φ
B) B
C) A
D) A x B

27. The set {x ∈ R: a < x < b is denoted by
A) [a, b)
B) (a, b]
C) (a, b)
D) {a, b}

28. A function f: A→B is said to be a periodic function if .....
A) f(x) = f(α)
B) f(x) = f(x – α)
C) f(x) = f(x + 2α)
D) f(x) = f(x + α)

29. f(x) = tanx is a periodic function with period …....
A) π
B) 2π
C) π/2
D) 3π

30. If A = {2, 3, 4}, B = {4, 5, 6} and C = {6, 7} then Ax(C – B) =
A) {(2,7) (3,7) (7,4)}
B) {(2,7) (3,3) (4,7)}
C) {(7,2) (3,7) (4,7)}
D) {(2,7) (3,7) (4,7)}

31. The n^{th} term of 1 + 3 + 5 + 7 + ...
A) 2n
B) 2n + 1
C) 2n – 1
D) 1 – 2n

32. If x = 2.52 then ⌊52.2⌋ =
A) 0
B) 1
C) 2
D) 3

33. The elements in level-1 are called .....…
A) electrons
B) atoms
C) neutrons
D) molecules

34. A Poset S is said to be ..... Set if for a, b in S exactly one of the conditions, a > b, a = b or b > a holds.
A) totally ordered
B) ordered
C) not ordered
D) completely ordered

35. Let (S,*) be a semigroup and let T be a subset of S. If T is closed under the operation *, Then (T,*) is called a ..... of (S,*)
A) semigroup
B) super group
C) subgroup
D) subsemigroup

36. The semigroup S/R is called the .....
A) totally ordered
B) quotient semigroup
C) not ordered
D) completely ordered

37. A finite integral domain is a .....
A) subfield
B) vector
C) field
D) ring

38. An integral domain D is said to be of characteristic 0 if the relation $ma \neq 0$ where $0 \neq a \in D$ and m is an integer, can hold only if
A) m = 0
B) m =1
C) m = 2
D) m = – 1

39. P∧Q is called the .....… of P and Q.
A) conditional
B) conjunction
C) bi-conditional
D) disjunction

40. In the implication P → Q, P is called the .....
A) consequent
B) premise
C) conditional
D) statement

41. If A = {2, 3, 5} and B = {4, 6, 9} then if R is defined as $R = \{(a,b) \in bAxB/a\}$ then the set R =
A) {(2,4), (2,6), (3,4), 3,9)}
B) {(2,4), (2,6), (3,6), 3,9)}
C) {(2,4), (2,9), (3,6), 3,9)}
D) {(4,2), (2,6), (3,6), 3,9)}

42. If R = {(2,1), (3,1), (5,1), (5,4)} then R^{-1} =
A) {(2,1), (3,1), (5,1), (4,5)}
B) {(2,1), (3,1), (5,1), (5,4)}
C) {(1,2), (1,3), (1,5), (4,5)}
D) {(2,1), (3,1), (5,1), (4,5)}

43. If 4^{th}, 7^{th} and 10^{th} terms of G.P. are a, b, c respectively then
A) $b^2 = ac^2$
B) $b^2 = a+c$
C) $b^2 = a^2c^2$
D) $b^2 = ac$

44. A relation R on a set A is said to be symmetric if $(a,b) \in R \Rightarrow$
A) $(b,a) \in R$
B) $(b^2,a^2) \in R$
C) $(x,y) \in R$
D) (y,x) Î R

45. Consider the set of all straight lines in a plane. If the relation R is defined as "parallel to" then R is
A) reflexive
B) symmetric
C) transitive
D) A), B) and C)

46. The next permutation to 4123 in the reverse Lexicographic order is
A) 3412
B) 3421
C) 2413
D) 4312

47. Let $(L, \wedge, \vee)$ be an algebraic lattice and $x \in L$ then $x \wedge x =$
A) x
B) x^2
C) x^3
D) 1/x

48. If L is a finite lattice then L is
A) supremum
B) infimum
C) bounded
D) unbounded

49. If H is a subgroup of G and $a, b \in G$. Then aH = bH if and only if
A) $a^{-1} b^{-1} \in H$
B) $ab \in H$
C) $ab^{-1} \in H$
D) $a^{-1} b \in H$

50. If Φ is a homomorphism of G into G' with kernel K then K is a ..... of G
A) normal subgroup
B) subgroup
C) bounded subgroup
D) unbounded subgroup