Vidyavardhini's College of Engineering & Technology, Vasai

Department of Computer Engineering

Academic Year 2020-21

Sub: Discrete Mathematics (CSC303)

Year/Sem:- SE/ Sem III
Max. Marks: 50

Q.No.	Questions	Marks
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}	2
2	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)}	2
3	The compound propositions p and q are called logically equivalent if ________ is a tautology. a) $p \leftrightarrow q$ b) $p \rightarrow q$ c) $\neg (p \vee q)$ d) $\neg p \vee \neg q$	2
4	$p \rightarrow q$ is logically equivalent to ________ a) $\neg p \vee \neg q$ b) $p \vee \neg q$ c) $\neg p \vee q$ d) $\neg p \wedge q$	2
5	$(p \rightarrow q) \wedge (p \rightarrow r)$ is logically equivalent to ________ a) $p \rightarrow (q \wedge r)$ b) $p \rightarrow (q \vee r)$ c) $p \wedge (q \vee r)$ d) $p \vee (q \wedge r)$	2
6	$\neg (p \leftrightarrow q)$ is logically equivalent to ________ a) $p \leftrightarrow \neg q$ b) $\neg p \leftrightarrow q$	2

	c) ¬p ↔ ¬q d) ¬q ↔ ¬p	
7	p ∨ q is logically equivalent to ________ a) ¬q → ¬p b) q → p c) ¬p → ¬q d) ¬p → q	2
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	2
9	Consider the relation: R' (x, y) if and only if x, y>0 over the set of non-zero rational numbers,then R' is _________ a) not equivalence relation b) an equivalence relation c) transitive and asymmetry relation d) reflexive and antisymmetric relation	2
10	Let S be a set of n>0 elements. Let be the number B_r of binary relations on S and let B_f be the number of functions from S to S. The expression for B_r and B_f, in terms of n should be ____________ a) n^2 and $2(n+1)^2$ b) n^3 and $n^{(n+1)}$ c) n and $n^{(n+6)}$ d) $2^{(n*n)}$ and n^n	2
11	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}}	2
12	A function is said to be ______________ if and only if f(a) = f(b) implies that a = b for all a and b in the domain of f. a) One-to-many b) One-to-one c) Many-to-many d) Many-to-one	2
13	The inverse of function $f(x) = x^3 + 2$ is ____________ a) $f^{-1}(y) = (y - 2)^{1/2}$ b) $f^{-1}(y) = (y - 2)^{1/3}$ c) $f^{-1}(y) = (y)^{1/3}$ d) $f^{-1}(y) = (y - 2)$	2

14	Let f and g be the function from the set of integers to itself, defined by f(x) = 2x + 1 and g(x) = 3x + 4. Then the composition of f and g is ____________ a) 6x + 9 b) 6x + 7 c) 6x + 6 d) 6x + 8	2
15	How many even 4 digit whole numbers are there? a) 1358 b) 7250 c) 4500 d) 3600	2
16	In a multiple-choice question paper of 15 questions, the answers can be A, B, C or D. The number of different ways of answering the question paper are ________ a) 65536 x 4^7 b) 194536 x 4^5 c) 23650 x 4^9 d) 11287435	2
17	How many five-digit numbers can be made from the digits 1 to 7 if repetition is allowed? a) 16807 b) 54629 c) 23467 d) 32354	2
18	In a 7-node directed cyclic graph, the number of Hamiltonian cycle is to be ______ a) 728 b) 450 c) 360 d) 260	2
19	If each and every vertex in G has degree at most 23 then G can have a vertex colouring of __________ a) 24 b) 23 c) 176 d) 54	2
20	If G is the forest with 54 vertices and 17 connected components, G has _______ total number of edges. a) 38 b) 37 c) 17/54 d) 17/53	2

21	A non empty set A is termed as an algebraic structure ________ a) with respect to binary operation * b) with respect to ternary operation ? c) with respect to binary operation + d) with respect to unary operation –	2
22	An algebraic structure _________ is called a semigroup. a) (P, *) b) (Q, +, *) c) (P, +) d) (+, *)	2
23	A monoid is called a group if _______ a) (a*a)=a=(a+c) b) (a*c)=(a+c) c) (a+c)=a d) (a*c)=(c*a)=e	2
24	A cyclic group is always _________ a) abelian group b) monoid c) semigroup d) subgroup	2
25	{1, i, -i, -1} is _________ a) semigroup b) subgroup c) cyclic group d) abelian group	2