

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (2012 to 2017) (Sem.-4)

DISCRETE STRUCTURES

Subject Code : BTCS-402

M.Code : 71106

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Answer briefly :**

- 1) Define Poset.
- 2) Define Anti-symmetric relation.
- 3) Write General Inclusion-Exclusion principle.
- 4) State Involution Law in Boolean algebra.
- 5) Find the number of distinct permutations that can be formed from all the letters of word 'PROGRAMMING'.
- 6) Give an example of graph that has Euler's circuit but Hamiltonian circuit.
- 7) Define Cyclic Subgroup.
- 8) Write generating function of $S(n) = 2 \cdot 7^n, n \geq 0$.
- 9) Define Directed Graph.
- 10) What is the difference between a graph and a tree?

SECTION-B

- 11) If R is equivalence relation on a set A , then show that R^{-1} is also equivalence relation on A .
- 12) Reduce the following Boolean expressions to complete sum of products form:
- $f(x,y,z) = x(y'z)'$
 - $f(x,y,z) = z(x'+y) + y'$
- 13) Show that in group G , $(xy)^{-1} = y^{-1}x^{-1} \forall x,y \in G$.
- 14) Prove that in any graph :
- There are even number of vertices of odd degree.
 - Sum of degree of all the vertices is even.
- 15) Define and give example of :
- Isomorphism
 - Integral domain.

SECTION-C

- 16) Solve the recurrence relation by using generating function :
- $$S(n-2) = S(n-1) + S(n), \text{ where } S(0) = 1, S(1) = 1.$$
- 17) State and prove Euler's theorem in graph theory.
- 18) If $\{B, +, \cdot, '\}$ is Boolean Algebra, then :
- If $x + y = x + z$ and $x' + y = x' + z$ then $y = z$.
 - If $x \cdot y = x \cdot z$ and $x' \cdot y = x' \cdot z$ then $y = z$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.