

Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech.(CSE/IT) (Sem.-3)**  
**DISCRETE STRUCTURES**  
Subject Code : BTCS-302  
Paper ID : [A1124]

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. How many subset can be formed from a set of  $n$  elements? How many of these will be proper?
2. Give an example of a relation which is both symmetric and antisymmetric.
3. How many words can be obtained by arranging the letter of the word 'DISCRETE'? In how many of them D, I, S occur together?
4. List all the elements and draw Hasse diagram of  $D_{36}$ .
5. Define Ideal of a Ring and Quotient Ring.
6. Give an example of finite abelian group.
7. State Lagrange's Theorem. Is its converse true?
8. Show that identity element of a group is unique.
9. Define bipartite graph with example.
10. Differentiate between path and circuit.

**SECTION-B**

11. Use Karnaugh map to find the minimal sum for  $f(x, y, z, t) = xy' + xyz + x'y'z' + x'yz't'$ .
12. Show that  $X = \{0,1,2,3,4,5\}$  is a commutative ring with unity under addition and multiplication modulo 6.
13. Is the relation of perpendicularity between two lines is an equivalence relation, Justify.
14. Show that  $K_{3,3}$  is not a planer graph.
15. Prove that every subgroup of Cyclic group is cyclic.

**SECTION-C**

16. Solve recurrence relation  $S(K + 2) - 5 S(K + 1) + 6S(K) = 5^t$ .
17. Show that set of even integer is a commutative ring without unity.
18. State and prove Eulerian theorem on graph to show that Koinigsberg's graph is not proved to a solution.