Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   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 $f(x, y, z, t) = xy' + xyz + x'y'z' + x'yzt'$.

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 $S(K + 2) - 5 S(K + 1) + 6S(K) = 5^r$.

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.