

Exam. Code : 206701

Subject Code : 5173

M.Sc. Computer Science 1st Semester

MCS-104 : DISCRETE STRUCTURES

Time Allowed—3 Hours] [Maximum Marks—100

Note :— Attempt any *five* questions. All questions carry equal marks.

1. (a) What are Functions ? Discuss various types of Functions. 10
- (b) Discuss the use of binary relations in Computer Science. 10
2. (a) Let B be a non-empty set such that $B \times A = B \times C$. Show that $A = C$. 5
- (b) Discuss the use of Inclusion Exclusion principle in detail. 15
3. (a) Explain the concept of partial order partitions. 10
- (b) If S is a relation in $N \times N$ defined in $(x,y) S (m,n)$ iff $x + n = y + m$, show that S is equivalence relation. 10
4. Differentiate :
 - (a) Circuit and Path 10
 - (b) Connected and Bipartite Graphs. 10

5. (a) What are Eulerian chains and cycles ? How Eulerian graph assists travelling salesman problem ? 10
- (b) What is meant by graph traversing ? Discuss the applications of traversing in computation. 10
6. (a) What is graph coloring ? Discuss the statement "Every planar graph is not 2-colorable". 10
- (b) A sack contains 4 red balls, 5 green balls and 3 blue balls. Three balls are drawn at random. Find the chance that all three balls are not of different colors. 10
7. (a) "Every subring is a ring under addition." Comment and justify. 10
- (b) Compare Integral Domains with Euclidean Domains. 10
8. Write short notes on the following :
- (a) Boolean Algebra 10
- (b) Switching Function. 10