



**I Semester M.C.A. (Two Years Course) Examination, May/June 2025
(CBCS) (2020 – 21 and Onwards)**

COMPUTER SCIENCE

1MCA2 : Discrete Mathematics

Equivalent to Discrete Mathematics and its Application (2013 and Below)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer any 5 from Section – A.
2) Answer any 4 from Section – B.

SECTION – A

Answer any five questions. Each question carries six marks.

(5×6=30)

1. a) Prove that “Null set is a subset of every set”. 3
b) If A, B and C are three sets, then prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$. 3
2. Show that the compound propositions $[p \rightarrow (\sim q \vee r)] \leftrightarrow \sim[p \rightarrow (q \rightarrow r)]$ is contradiction or not. 6
3. a) Let $f : R \rightarrow R$ is defined by $f(x) = 7x + 5$. Prove that f is one-one and onto function. 3
b) Let $A = \{1, 2, 3, 4, 6\}$ and R be the relation on A defined by aRb if and only if “a is a multiple of b”.
i) Write down R as a set of ordered pair.
ii) Represent R as a matrix form.
iii) Draw the digraph of R. 3
4. Obtain an explicit form for the following sequence a_n defined recursively by $a_n = 2a_{n-1} + 1$ for $n \geq 2$ with $a_1 = 3$. 6
5. a) Show that the open interval $(0, 1)$ is uncountable. 3
b) Find converse, inverse and contrapositive of the following implication : “If it rains then the match will be cancelled.” 3
6. Define the following with example.
Graph, Connected graph, Undirected Graph. 6