

BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2022 COURSE)

B.C.A. Sem – I : WINTER- 2022

SUBJECT : DISCRETE MATHEMATICS

Day : Monday

Time : 02:00 PM-05:00 PM

Date : 19-12-2022

W-25955-2022

Max. Marks : 100

N.B.:

- 1) Attempt any **FIVE** questions from Section –I. Each question carries **12** marks.
- 2) Attempt any **TWO** questions from Section –II. Each question carries **20** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 4) Use of non-programmable **CALCULATOR** is allowed.

SECTION-I

- Q.1** Define set. Explain various operations of sets with appropriate examples. (12)
- Q.2** Let the functions f and g be defined by $f(x) = x^3$ and $g(x) = x^2 - 1$. (12)
Find i) $f \circ f$ ii) $f \circ g$ iii) $g \circ g$
- Q.3** Find the truth tables for the following statements: (12)
i) $(p \rightarrow q) \vee (\sim p \vee \sim q)$ ii) $(p \wedge q) \rightarrow (p \vee q)$
- Q.4** Given $A = \begin{bmatrix} 2 & 3 & 1 \\ 4 & 7 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 & 2 \\ 4 & 6 & 1 \\ 1 & 0 & 2 \end{bmatrix}$, $C = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & 4 \\ 3 & 4 & 5 \end{bmatrix}$ (12)
find matrix X , such that $3A - 2B + 4X = 5C$
- Q.5** Explain the Sum Rule principle and Product Rule principle with appropriate example. (12)
- Q.6** Two fair coins are tossed. Find the probability of getting: (12)
i) atleast one tail ii) atmost one tail iii) no tail
- Q.7** Write short notes on any **TWO** of the following: (12)
a) Representation of matrix in computers
b) Relation
c) Conditional probability

SECTION-II

- Q.8** What is the logic gate? Explain OR, NOT logic gates. (20)
Draw a logic circuit for i) $AB + AC$ ii) $(A + B)C$
- Q.9** Find the inverse of matrix by Adjoint method. (20)
 $A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & -1 & 2 \\ -1 & 2 & 1 \end{bmatrix}$
- Q.10** A bag contains six white marbles and five red marbles. Find the number of ways, four marbles can be drawn from the bag if: (20)
i) they can be any colour
ii) two must be white and two red.
iii) they must all be of same colour.
iv) three must be white and one red.

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