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SF—21—2022

FACULTY OF COMPUTER SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

MAY/JUNE, 2022

(CBCS/Revised Course)

COMPUTER SCIENCE

Paper (304)

[Mathematical Techniques in Computer Science (MTCS)]

(Friday, 1-7-2022)   **Time : 2.00 p.m. to 5.45 p.m.**

Time— 3.45 *Hours*   *Maximum Marks*—75

N.B. :—   (*i*)   *All* questions are compulsory.

        (*ii*)   Figures to the right indicate full marks.

        (*iii*)   Assume suitable data, if required.

        (*iv*)   Any Electric-device is not allowed.

1.   Attempt any *five* of the following :   15

   (*a*)   Explain sets.

   (*b*)   Find determinant of A = $\begin{vmatrix} 2 & 4 \\ 3 & 1 \end{vmatrix}$.

   (*c*)   Describe graphs.

   (*d*)   Explain probability.

   (*e*)   Describe relation.

   (*f*)   Find the sum of all two digit numbers divisible by 5.

   (*g*)   Find H.C.F. of 108, 288 & 360.

2.   Attempt any *three* of the following :   15

   (*a*)   Describe types of relation.

   (*b*)   Define event. Explain its types.

P.T.O.

(c) Explain Isomorphism of graphs.

(d) A bag contains 7 red and 4 white balls, two balls are drawn at random. Find the probability that both the balls are red.

(e) Find the following terms are in geometric progression

$$3, 6, 12, 24,......,384.$$

3. Attempt any *three* of the following :   15

(a) Explain types of sets.

(b) Find inverse of matrix :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 7 \end{bmatrix}$$

(c) Explain degree of vertices with example.

(d) Describe sample space with example.

(e) Find the matrix X

$$X + \begin{bmatrix} 4 & 6 \\ -3 & 8 \end{bmatrix} = \begin{bmatrix} 3 & -6 \\ 5 & -7 \end{bmatrix}$$

4. Attempt any *three* of the following :   15

(a) Find AB where :

$$A = \begin{bmatrix} 1 & 2 \\ 0 & 4 \end{bmatrix}, \ B = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 4 & 2 \end{bmatrix}$$

(b) Describe arithmetic progression.

(c) A does a work in 10 days and B does the same work in 15 days. In how many days they together will do the same work ?

(d) A car moves at the speed of 80 km/hr. Find the speed of the car in meter per second.

(e) Explain types of graphs.

5.   Attempt any *three* of the following :   15

    (*a*)   Explain walks, paths and circuit.

    (*b*)   Describe types of matrices.

    (*c*)   Prove that :

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

    (*d*)   A person crosses a 600 m long street in 5 min. Find his speed in km per hour.

    (*e*)   If A = {1, 2, 3, 4, 5}, B = {6, 7, 8, 9}, then find :

       (*i*)   (A $\cup$ B)

       (*ii*)   (A − B)

       (*iii*)   (A $\cap$ B)

       (*iv*)   (B − A).