NBI-003-1032004   Seat No. _____

B.C.A. (Sem. II) (CBCS) Examination

April/May - 2017

CS-10 : Mathematical &
Statistical Foundation of Comp. Science

Faculty Code : 003

Subject Code : 1032004

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instruction :   All questions are compulsory.

1   (a)   Answer the following questions in brief :   4

   (1)   How many elements in a 3×3 determinant ?

   (2)   Write the expansion of 2×2 determinant.

   (3)   How many elements in a 2×2 determinant ?

   (4)   Define determinant.

   (b)   Answer any one from following two questions :   2

   (1)   If $A = \begin{vmatrix} 2 & 4 \\ a & 7 \end{vmatrix} = 2$ then find a.

   (2)   If $A = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$ then find the value of A.

(c)   Answer any one from following two questions :   **3**

(1)   Solve : $2x + 3y - 5 = 0$, $3x - 2y - 1 = 0$ by Cramer's rule.

(2)   If $A = \begin{vmatrix} 1 & 2 & 1 \\ 2 & a & 2 \\ -3 & 2 & 1 \end{vmatrix} = 0$ then find a.

(d)   Answer any one from following two questions :   **5**

(1)   Explain any two properties of determinants.

(2)   Solve :
$2x + y - 2z - 1 = 0$, $3x + 2y - 3z - 2 = 0$, $x + 3y - 2z - 2 = 0$
by Cramer's rule.

2   (a)   Answer the following questions in brief :   **4**

(1)   Define diagonal matrix.

(2)   Define transpose of matrix.

(3)   Define symmetric matrix.

(4)   Define null matrix.

(b) Answer any one from following two questions :   **2**

(1) If $A = \begin{bmatrix} 3 & 1 & 2 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 3 & 4 \\ 2 & 1 \end{bmatrix}$ then find $A*B$.

(2) If $A = \begin{bmatrix} 3 & 1 & 2 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 4 \end{bmatrix}$ then find $A + B$.

(c) Answer any one from following two questions :   **3**

(1) Define square and unit matrix.

(2) If $\begin{bmatrix} x & x+y \\ 4 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 7 \\ 4 & 3 \end{bmatrix}$ then find x and y.

(d) Answer any one from following two questions :   **5**

(1) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 3 \\ 3 & 2 & 1 \end{bmatrix}$.

(2) Find the adjoint of the matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 1 & -3 \\ -1 & 1 & 2 \end{bmatrix}$.

3 (a) Answer the following questions in brief : **4**

    (1) The distance between two points (2, 3) and (5, 7) is ____.

    (2) Define singleton set.

    (3) Find the midpoint of line segment joining points A(1, 3) and B(5, 1).

    (4) Define power set.

  (b) Answer any one from following two questions : **2**

    (1) If the distance between two points A(x, –4) and B(–8, 2) is 10 then find A.

    (2) Define Cartesian products of two sets.

  (c) Answer any one from following two questions : **3**

    (1) If the midpoint of $\overline{AB}$ is (1,1) and A is (–1, 0) then find the co-ordinates of B.

    (2) If $A = \{1, 5, 3\}$ $B = \{5, 3\}$ $C = \{1, 5, 10\}$ $D = \{3, 8\}$ then prove that $(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$.

  (d) Answer any one from following two questions : **5**

    (1) Explain De'Morgan laws with logical proof.

    (2) Show that (–3, –2), (7, 4) and (1, 14) are the vertices of an isosceles right angled triangle.

4 (a) Answer the following questions in brief :   **4**

       (1) Define Mean.

       (2) Define Median.

       (3) Define Mode.

       (4) Define range.

   (b) Answer any one from following two questions :   **2**

       (1) Define standard deviation.

       (2) For the data 1, 3, 7, 10, 5, 12, 14, 16, 5, 9. Find mode.

   (c) Answer any one from following two questions :   **3**

       (1) Calculate the mean for the following frequency distribution.

Class interval	0-8	8-16	16-24	24-32	32-40	40-48
Frequency	8	7	16	24	15	7

       (2) Obtain the median for the following frequency distribution.

X	1	2	3	4	5	6	7	8	9
F	8	10	11	16	20	25	15	9	6

(d) Answer any one from following two questions : **5**

(1) Calculate the mean and standard deviation for the following table giving the age distribution of 542 members

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	153	140	51	2

(2) The median and mode of the following wage distribution are known to be Rs. 33.50 and Rs. 34 respectively. Find the value of k :

Wages: in (Rs.)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	4	16	k	100	40	6	4	230

5 (a) Answer the following questions in brief : **4**

(1) Define sequence.

(2) Define series.

(3) Write down the formula of nth terms of an Arithmetic progression.

(4) Write down the formula of nth terms of a Geometric progression.

(b) Answer any one from following two questions : **2**

    (1) Find the sum of the first n terms of the series
        1+3+5+7+........

    (2) Define arithmetic mean and geometric mean.

(c) Answer any one from following two questions : **3**

    (1) For an A.P. $T_5 = 10$ and $T_{10} = 40$. Then find T_{20}.

    (2) If the third term of AP is 12, sixth term is 42, and then finds T_{26}.

(d) Answer any one from following two questions : **5**

    (1) 1, 4, 7, 10, ... Find $S_{37}, S_{11}, S_{36}, T_{36}, T_{57}$.

    (2) The sum of three consecutive terms of an A.P. is 12 and the sum of the Cubes of these terms are 288. Find the terms.

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