



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 n^{th} terms of an Arithmetic progression.
- (4) Write down the formula of n^{th} 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
 $1+3+5+7+\dots$

(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.
