



MBI-003-1042004

Seat No. \_\_\_\_\_

**B. Sc. (I. T.) (Sem. II) (CBCS) Examination**

**March / April - 2018**

**Mathematical & Statistical Foundation of  
Computer Science  
(New Course)**

**Faculty Code : 003**

**Subject Code : 1042004**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

**Instructions :** (1) Write answers of all questions in main answer sheet.

(2) Figures to the right indicate marks.

1 (a) Attempt all : 4

(1) If  $\begin{vmatrix} 3x & 5x+14 \\ 3 & 7 \end{vmatrix} = 0$ , then  $x =$  \_\_\_\_\_

(2) State the value of  $\begin{vmatrix} -4 & -3 \\ -3 & -3 \end{vmatrix}$

(3) Value of  $\begin{vmatrix} 1 & 4 & 8 \\ 4 & 8 & 16 \\ 7 & 3 & 6 \end{vmatrix}$  is \_\_\_\_\_

(4) If any two rows of a determinant are interchanged the value of new determinants is \_\_\_\_\_

(b) Any **one** : 2

(1) Find the value  $\begin{vmatrix} x+2 & 2 \\ 3 & 3+x \end{vmatrix}$

(2) Find the value of  $K$  if  $\begin{vmatrix} K & 3 & 5 \\ 2 & 7 & 8 \\ 30 & 15 & 25 \end{vmatrix} = 0$

(c) Any **one** : 3

(1) Explain :  $2 \times 2$  determinant.

(2) Solve the following equations using Cramer's rule :

$$2x - 3y = 3, \quad 4x - y = 11$$

(b) Any **one** : 5

(1) Explain : Properties of Determinant.

(2) Solve the following equations using Cramer's rule :

$$2x + 3y - z = 5, \quad 3x + 2y + z = 10, \quad x - 5y + 3z = 0$$

2 (a) Attempt **all** : 4

(1) If  $A = [1 \ 2 \ 3 \ 4]$ , then  $A$  is said to be a \_\_\_\_\_ matrix.

(2)  $(AB)^{-1} = \underline{\hspace{2cm}}$

(3) The determinant of unit matrix is \_\_\_\_\_.

(4)  $AA^{-1} = \underline{\hspace{2cm}}$ .

(b) Any **one** : 2

(1) Explain : Null matrix, Row matrix.

(2) Find  $AB$ , if  $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 3 & 0 \\ 2 & 0 & 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 4 \\ 1 & 3 \\ 0 & 2 \end{bmatrix}$

(c) Any **one** : 3

(1) Find  $A^{-1}$ .  $A = \begin{bmatrix} 6 & 3 \\ 4 & 5 \end{bmatrix}$

(2) If  $A^{-1} = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & 4 \\ 1 & 1 & 3 \end{bmatrix}$  and  $B^{-1} = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ ,

then find  $(AB)^{-1}$ .

(d) Any **one** : 5

(1) Explain : Matrix.

(2) If  $AB = \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$  and  $ABC = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}$ , then find  $C$ .

- 3 (a) Attempt **all** : 4
- (1)  $A' \cap B' = \underline{\hspace{2cm}}$
- (2) If  $A = \{1, 2, 3, 4\}$ ,  $B = \{4, 5, 6\}$ , then  $B - A = \underline{\hspace{2cm}}$ .
- (3) For two parallel lines which of the following condition is true ?
- (4) If the distance between  $(b, -5)$  and  $(2, b)$  is 13. Find the value of  $b$ .
- (b) Any **one** : 2
- (1) Define : Power set, Intersection set
- (2) The co-ordinate of two points  $A$  and  $B$  are  $(2, 1)$  and  $(4, 5)$ . Find the slope of the line  $AB$ .
- (c) Any **one** : 3
- (1) Verify that  $(A \cap B)' = A' \cup B'$
- (2) If the Pt  $(K, 3)$  is at a distance of  $\sqrt{5}$  units from the Pt  $(2, K)$ , find  $K$ .
- (d) Any **one** : 5
- (1) Prove that  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- (2) Obtain equation of line passing through a Pt  $(x_1, y_1)$  having slope  $m$ .
- 4 (a) Attempt **all** : 4
- (1) Median can be denoted as  $\underline{\hspace{2cm}}$ .
- (2) Mode can be denoted as  $\underline{\hspace{2cm}}$ .
- (3) The square value of S.D. is called  $\underline{\hspace{2cm}}$ .
- (4) Range =  $\underline{\hspace{2cm}}$ .
- (b) Any **one** : 2
- (1) Explain : Median.
- (2) Find mode : 3, 5, 4, 3, 7, 6, 4, 3, 2, 3, 4, 3
- (c) Any **one** : 3
- (1) Find : Merits of Mean.
- (2) Find  $Q_1$  :

$x :$	2	3	4	5	6	7	8	9	10	11
$f :$	3	6	9	18	20	14	10	10	7	2

(d) Any **one** : 5

(1) Explain : Standard deviation.

(2) Find Mean :

$x:$	10-18	18-30	30-40	40-54	54-80	80-100
$f:$	15	28	36	18	10	8

5 (a) Attempt **all** : 4

(1) The common diff. of an A.P.  $-5, -7, -9, -11$  is \_\_\_\_\_

(2) The G.M. of 18 and 8 is \_\_\_\_\_

(3)  $AH =$  \_\_\_\_\_

(4) If  $T_9 = 256, a = 2, r =$  \_\_\_\_\_ in G.P.

(b) Any **one** : 2

(1) Define : Arithmetic Progression.

(2) Find sum of first 9 terms of a G.P.

$$\frac{1}{27}, \frac{1}{9}, \frac{1}{3}, 1, \dots\dots\dots$$

(c) Any **one** : 3

(1)  $T_6 = 47, T_{10} = 75$  in A.P. Find  $T_{30}$ .

(2)  $T_4 = 72, T_7 = 576$ , in a G.P. find  $a$  and  $r$ .

(d) Any **one** : 5

(1) Prove that  $S_n = \frac{n}{2}(2a + (n-1)d)$

(2) Find the sum of  $n$  terms of  
 $4 + 44 + 444 + 4444 + \dots\dots\dots$