



MBI-003-003208

Seat No. _____

B. C. A. (Sem. II) (CBCS) Examination
March / April - 2018
Mathematical & Statistical Foundation of
Computer Science
(Old Course)

Faculty Code : 003

Subject Code : 003208

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

[Total Marks : 70

- Instructions :** (1) Figures to the right indicate marks.
(2) Write answers of all questions in main answer sheet.

- 1 (1) $\{1, 2, 3\} \cap \{2, 3, 4\} = \underline{\hspace{2cm}}$ **20**
(2) $A \cap B = \underline{\hspace{2cm}}$
(3) How many are subsets of a set $\{1, 2, 3, 4\}$?
(4) $A \cap A' = \underline{\hspace{2cm}}$
(5) The mean of the observations 4, 6, 10, 12, 18 is _____
(6) Median can be denoted as _____
(7) Range = _____
(8) Mode can be denoted as _____
(9) For two parallel lines which of the following condition is true.
(10) The slope of a line perpendicular to the whose equation is $2y + 6x = 24$ is _____
(11) The slope of the line passing through the points (2, 2) and (4, 6) is _____
(12) If the distance between $(b, -5)$ and $(-2, b)$ is 13. Find the value of b .
(13) Null matrix is denoted by _____
(14) Formula of A^{-1} .

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

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

(17) Write the formula of T_n in A.P.

(18) 2, 8, 32, 128, are in $\underline{\hspace{2cm}}$

(19) Write the formula of T_n in G.P.

(20) In G.P. ratio is denoted as $\underline{\hspace{2cm}}$.

2 (a) Any **three** :

6

(1) Explain : Empty set.

(2) Explain : Mean.

(3) Find the distance between two points (7, 8) and (1, 0).

(4) Write properties of intersection of sets.

(5) Find Mean :

$x :$	64	63	62	61	60	59
$F :$	8	18	12	9	7	6

(6) Explain : Slope.

(b) Any **three** :

9

(1) Verify that $(A \cup B)' = A' \cap B'$.

(2) If $A = \{1, -1, 0\}$, $B = \{0, 1\}$ then find $A \times B$.

(3) Find the equation of the st. line parallel to $2x - 3y - 5 = 0$ and passing through (4, 5).

(4) Find K if points (-3, 8), (K, 5) and (-5, 2) will be collinear.

(5) Explain : Merits of median.

(6) Find Q_1 :

$x :$	2	3	4	5	6	7	8	9	10	11
$f :$	3	6	9	18	20	24	10	10	7	2

(c) Any **two** : 10

- (1) Prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- (2) Obtain equation of line passing through a point (x_1, y_1) having slope m .
- (3) If $A = \{1, 2\}$, $B = \{a, b\}$, $C = \{b, c\}$, find $A \times (B \cap C)$ and $A \times (B \cup C)$.
- (4) Explain : Standard Deviation.
- (5) Find median :

$x :$	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
$f :$	10	20	30	50	40	30

3 (a) Any **three** : 6

- (1) Explain : Adjoint matrix.
- (2) Explain : Defⁿ. of Arithmetic progression.
- (3) $T_{12} = 20, T_{32} = 60$ for an A.P., find d .
- (4) $A = \begin{bmatrix} 1 & -1 \\ 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$ find $2A - 3B$.
- (5) 2, 6, 18, 54, find T_9 .
- (6) Find Adj A . $A = \begin{bmatrix} 7 & 8 \\ 2 & 10 \end{bmatrix}$.

(b) Any **three** : 9

- (1) Prove that $S_n = \frac{a(1-r^n)}{1-r}$
- (2) $T_4 = 22, T_{10} = 52$ are in A.P. Find S_{40} .
- (3) Find the sum of n terms
 $2 + 22 + 222 + 2222 + \dots$
- (4) If $A = \begin{bmatrix} 5 & 1 \\ 4 & 2 \end{bmatrix}$, then find A^{-1} .

(5) If $A = \begin{bmatrix} 4 & 5 \\ 3 & 0 \\ 7 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 6 & 7 \\ 1 & 1 & 0 \end{bmatrix}$, then find AB .

(6) If $A = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$, prove that $A^2 = I$

(c) Any **two** :

10

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

(2) the sum of three numbers in G.P. is 35 and their product is 1,000. Find the numbers.

(3) If $A = \begin{bmatrix} 1 & 0 & 7 \\ 2 & 2 & 5 \\ 0 & 3 & 6 \end{bmatrix}$, then find $A(\text{adj } A)$.

(4) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, find the value of $A^2 - A + I$.

(5) If $A = \begin{bmatrix} 4 & 1 \\ 2 & 2 \end{bmatrix}$. Find matrix B such that $A + 2B = A^2$.