



MBI-003-003204

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 : 003204

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

[Total Marks : 70

1 Answer the following : 20

(1) $\{0, 1, 2\} \cap \{4, 5, 6\} = \underline{\hspace{2cm}}$.

(2) $A \cap A' = \underline{\hspace{2cm}}$.

(3) If $A = \{5, 9\}$, $B = \{3, 5\}$, $A \cup B = \underline{\hspace{2cm}}$.

(4) $A \cap U = \underline{\hspace{2cm}}$

(5) Two line are perpendicular then relation between slope are $\underline{\hspace{2cm}}$.

(6) Write an equation of line, whose slope is 2 and point is (0, 1).

(7) Two lines are parallel, slope of one line is -1 , then slope of other line is $\underline{\hspace{2cm}}$.

(8) $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ is true or false.

(9) Two numbers are 2 and 8, then GM = $\underline{\hspace{2cm}}$.

(10) Write T_n formula for GP.

(11) The common difference of a sequance 5, 7, 9, 11..... is $\underline{\hspace{2cm}}$.

(12) AM = 5, HM = 3, then $G^2 = \underline{\hspace{2cm}}$.

- (13) Correlation coefficient for two variable lies in between _____ to _____.
- (14) $\sqrt{b_{xy} \times b_{yx}} =$ _____.
- (15) $Y = 10 + 0.4(X - 2010)$, If $X = 2018$ then $Y =$ _____.
- (16) $Y = ax^2 + bx + c$ is a second degree equation (True/False).
- (17) _____ chart is more sensitive.
- (18) $\bar{X} = 12.5$, $A_2\bar{R} = 5.3$, then $UCL_{(X)} =$ _____.
- (19) In C-chart _____ distribution is used.
- (20) SQC is known as _____.

2 (a) Attempt any three : **6**

- (1) Define Union of two sets.
- (2) Write De-Morgan's Law.
- (3) Write distance formula for two points.
- (4) Write equation of line passing through two points.
- (5) $X = \{0, 1, 2\}$ write power set of X .
- (6) Find Area of triangle whose vertices are
(2, 1) (-3, 1) and (0, -3)

(b) Attempt any three : **9**

- (1) Write properties of Intersection.
- (2) $A = \{0, 1, 2\}$, $B = \{-1, 0, 1\}$, $C = \{0, 1\}$ find
 $(A \cap B) \times C$.
- (3) Find equation of line passing through (3, 2)
and is parallel to $5x + y - 2 = 0$.
- (4) For what value of K , the Area of (-3, 8) (K , 5) and
(-5, 2) is 0.

- (5) Find technology matrix from Input-output table :

Input/output	X	Y	Final demand	Total production
X	45	80	100	150
Y	50	60	120	200

150 200

- (6) Explain Moving Average method.

- (c) Attempt any two : 10

- (1) For any three sets prove that

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

- (2) Obtain equation of line having intercepts a and b on both axes.
 (3) Fit a straight line to the following data :

Year:	1996	1997	1998	1999	2000
Value:	40	50	62	58	60

- (4) Find 3-yearly moving averages from time series :

Year:	1	2	3	4	5	6	7	8	9	10	11
Value:	2	5	10	6	14	19	21	24	30	35	20

- (5) Show that the points $(4, -5), (8, 1), (14, -3)$ and $(10, -9)$ are the vertices of a square.

- 3 (a) Attempt any three : 6

- (1) Define A.P.
 (2) Define GP.
 (3) Define AM., GM, and HM for two numbers.
 (4) Define Regression.

- (5) Find 19th term of $\frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \dots$

- (6) In AP, $S_n = 6n^2 + 2n$ find T_5 .

(b) Attempt any three : 9

- (1) Define Correlation.
- (2) Define SQC.
- (3) Write control limits for \bar{X} - chart.
- (4) $\sum(x-\bar{x})^2 = 210, \sum(y-\bar{y})^2 = 110, \sum(x-\bar{x})(y-\bar{y}) = -48$
find r .
- (5) For AP, $T_{21} = 41$ and $T_{11} = 21$, find first term and common difference.
- (6) Find 20th term of 2, 4, 8, 16.....

(c) Attempt any two : 10

- (1) The sum of three numbers is 26 and their product is 216. Find the numbers in GP.
- (2) Draw P-chart and state your comment.

Sample no:	1	2	3	4	5	6	7	8	9	10	11	12
No. of Defective:	22	16	18	14	38	3	20	36	26	8	0	19

[n = 200]

- (3) Following are the numbers of Defects noted in 15 pairs of clothes :
14, 13, 15, 11, 17, 18, 13, 15, 14, 12, 11, 16, 15, 13, 14
Draw an appropriate chart and put your comment.
- (4) Find Regression line y on x :

x :	10	11	12	5	6	8	2	3
y :	12	13	15	7	9	10	4	6

- (5) Find correlation coefficient from the following results :

$$\bar{x} = 5, \bar{y} = 4, \sum x = 125, \sum y = 100, \sum xy = 520, S_x^2 = 1,$$

$$S_y^2 = 1.44.$$