

003-003208

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

April-2014

Mathematics/Statistics Foundation of Computer Science

(New Course)

Faculty Code : 003
Subject Code : 003208

Time : 2½ Hours]

[Total Marks : 70

Instruction : Write answers of all questions in main answer sheet.

I. MCQ.

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(1) If $A = \{2, 4, 6, 8 \dots\}$, $B = \{1, 3, 5, 7 \dots\}$, then $A \cap B = \underline{\hspace{2cm}}$.

- (a) ϕ (b) N
(c) $\{2, 4, 6, 8\}$ (d) $\{1, 3, 5, 7\}$

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

- (a) $(A \cap B)'$ (b) $(A \cup B)'$
(c) $A' \cup B'$ (d) None of these

(3) If $A = \{1, 2, 3, 4\}$ and $B = \{4, 5, 6\}$, then $B - A = \underline{\hspace{2cm}}$.

- (a) $\{4\}$ (b) $\{1, 2, 3, 4, 5, 6\}$
(c) $\{5, 6\}$ (d) $\{1, 2, 3\}$

(4) $A - B = \underline{\hspace{2cm}}$.

- (a) $B - A$ (b) $A' \cap B'$
(c) $A' \cap B$ (d) None of these

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P.T.O.

(5) If $A = \{1, 5, 7, 9\}$, $B = \{5, 4, 8\}$, then $A \cap B = \underline{\hspace{2cm}}$

- (a) $\{5\}$ (b) 5
(c) ϕ (d) $\{1, 4, 5, 7, 8, 9\}$

(6) The slope of a line perpendicular to the whose equation is $2y + 6x = 24$ is

- (a) $1/6$ (b) $1/3$
(c) $-1/6$ (d) -3

(7) For two perpendicular lines, which of the following conditions is true ?

- (a) $m_1 \neq m_2$ (b) $m_1 = m_2$
(c) $m_1 \times m_2 = -1$ (d) $m_1 \times m_2 = 1$

(8) For what value of k if $2k + 4$, $3k - 7$ and $k + 12$ from an A.P. ?

- (a) 12 (b) 14
(c) 20 (d) None of these

(9) Write the formula of S_n in G.P.

- (a) $\frac{a(r^n - 1)}{r - 1}$ (b) $\frac{a}{r}$
(c) $\frac{ar^n - 1}{r - 1}$ (d) $\frac{a}{r - 1}$

(10) Write the formula of S_n in A.P.

- (a) $\frac{n}{2}(2 + (n-1)d)$ (b) $\frac{n}{2}(2a + (n-1)d)$
(c) $\frac{n}{2}(2n + (a-1)d)$ (d) None of these

(11) $T_{12} = 20$, $T_{32} = 60$ for an A.P. Find T_{40} .

- (a) 67 (b) 60
(c) 76 (d) 80

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(12) For an A.P. $S_n = n(n + 1)$. Find T_n .

- (a) $3n$ (b) $5n$
(c) n^2 (d) $2n$

(13) Write $A^{-1} =$ _____.

- (a) $\frac{\text{adj } A}{|A|}$ (b) $\frac{\text{adj } A}{A}$
(c) $A \cdot \text{adj } A$ (d) None of these

(14) Write $(AB)^{-1} =$ _____.

- (a) $A^{-1} \cdot B^{-1}$ (b) $B^{-1} \cdot A^{-1}$
(c) BA (d) None of these

(15) If $A = \{a_{11}, a_{12}, a_{13}, \dots, a_{1n}\}$, then it is said to be a _____ matrix.

- (a) Column (b) Null
(c) Row (d) None of these

(16) If A is a matrix of order $m \times n$ and B is a matrix of order $n \times p$, then the product BA will be a matrix of order _____.

- (a) $m \times p$ (b) $p \times m$
(c) $m \times n$ (d) None of these

(17) Range $R =$ _____

- (a) $H - L$ (b) $L - H$
(c) $\frac{H - L}{2}$ (d) None of these

(18) The square value of S.D is called _____.

- (a) Mean (b) Variance
(c) Mean deviation (d) Mode

(19) Range, Q. D, M.D and S.D are the measure of _____.

- (a) Skewness (b) Mean
(c) Dispersion (d) None of these

(20) The value of Z , for the observations 0, 1, 2, 3, 1, 4, 1, 0, 3, is _____

- (a) 0 (b) 2
(c) 3 (d) 1

2. (a) Any three :

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- (1) Explain : Empty set, Subset.
(2) Write properties of intersection of sets.
(3) Find the distance between the points (7, 8) and (1, 0)
(4) Prove that (-2, -2), (-1, -2), (3, 1) are the vertices of an isosceles triangle.
(5) Find mean :

x : 64 63 62 61 60 59

f : 8 18 12 9 7 6

- (6) Explain : Range.

6) Any **three** :

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- (1) Find equation of the line passing through the points (3, -7) and (-4, 9).
- (2) Find the equation of line passing through (4, 2) and Parallel to $3x - 2y = 5$.
- (3) If $U = \{1, 2, 3, 4, 5, 6\}$, $A = \{2, 3, 6\}$, $B = \{3, 5, 6\}$ verify that $(A \cup B)' = A' \cap B'$.
- (4) If $A = \{2, 4\}$, $B = \{2, 4, 6\}$, then find $A \times B$.
- (5) Explain : Merits of Median.
- (6) Find the mean deviation from mean of the following data :

x :	60	61	62	63	64	65	66	67	68
f :	2	0	15	29	25	12	10	4	3

(c) Any **two** :

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- (1) Prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- (2) If $A = \{x/x^2 - 5x + 6 = 0, x \in N\}$, $B = \{y/y^2 - 4 = 0, y \in z\}$,
 $C = \{z/z^2 - 9z + 14 = 0, z \in N\}$, find $(A \times B) \cup (A \times C)$.

(3) Find Median

x :	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69
f :	12	19	31	24	16	8

(4) Find quartile deviation

x :	50 - 53	53 - 56	56 - 59	59 - 62	62 - 65	65 - 68
f :	2	7	24	27	13	3

(5) Find standard deviation

x :	0 - 500	500 - 1000	1000 - 1500	1500 - 2000	2000 - 3000
f :	90	218	86	41	15

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

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- (1) Define with example : Arithmetic Progression.
- (2) If the 35th term of an A.P. is 30, then sum of its first 69 terms.
- (3) $T_3 = 4$ and $T_9 = -8$ are in A.P. Find which term is zero.
- (4) Explain : Null matrix. Transpose matrix.

(5) If $A = \begin{bmatrix} 2 & 5 & 7 \\ 8 & 4 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 6 & -2 \\ 3 & 7 \end{bmatrix}$, find AB.

(6) If $x = \begin{bmatrix} 5 & 1 \\ 0 & 2 \end{bmatrix}$, $y = \begin{bmatrix} -2 & 0 \\ 1 & -3 \end{bmatrix}$, $z = \begin{bmatrix} 3 & 1 \\ 2 & 7 \end{bmatrix}$, find $x(y + Z)$.

(b) Any **three** :

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- (1) If the 3rd term of G.P. is the square of the first and fifth term is 64. Find the series.
- (2) Prove that $T_n = ar^{n-1}$
- (3) Find the sum of n terms of the series

$$9 + 99 + 999 + 9999 + \dots$$

(4) $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$, find BB' .

(5) Find adjoint of following matrix :

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$$

(6) If $A = [2, 1, 3]$, $B = [3 \ 2 \ 5]$, $C = \begin{bmatrix} 3 & 1 & 0 \\ 2 & 0 & 5 \\ 5 & 2 & 0 \end{bmatrix}$, then find $A(BC)'$.

(C) Any two :

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

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

Prove that $(A+B)^2 = A^2 + B^2$.

(3) If $A = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 1 & 0 & -1 \end{bmatrix}$, then prove that

$$A^3 - 3A^2 + 3A - 2I_3 = O_3.$$

(4) If $A = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} x & y \\ 3 & 5 \end{bmatrix}$, find the value of x and y if $AB = BA$.

(5) In a G.P. the sum of n terms is 511, the last term is 256 and the common ratio is 2. Find n and the first term of G.P.