NBI-003-003208 Seat No. _____

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

April/May – 2017

Mathematical & Statistical Foundation of Computer Science

(Old Course)

Faculty Code : 003

Subject Code : 003208

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Attempt the following. Each of one mark : **20**

(1) Null set is denoted by ϕ (true/false)

(2) $A \cap B = B \cap A$ (true/false)

(3) $(A \cup B)' = A' \cap B'$ (true/false)

(4) $A - B = A \cap B'$ (true/false)

(5) The slope of (2, 2) and (5, 5) is _____.

(6) In a square all sides are _____.

(7) When points are co-linear, Area is 0 (true/false).

(8) The distance formula for two points is

$d = (x_1 - x_2)^2 + (y - y_2)^2$ (true/false)

(9) The common ratio of a GP 4, 12, 36 is _____.

(10) In AP if a = 4, d = 5, then T_5 is _____.

(11) Sixth term of a sequence 2, 4, 8,.....is _____.

(12) In AP, $S_n = 2n + 1$, find T_{10}.

(13) Matrix is always square. (true/false)

(14) A matrix is symmetric then $A^{-1} = A^T$ (true/false)

(15) Order of A is 3×4 then order of A^T is 3×4 (true/false)

(16) $AA^{-1} \neq I$ (true/false)

(17) The average of 5, 8, 9, 4 is _____.

(18) Quartiles means a set is decided into 4 parts. (true/false).

(19) The value which occur more time in series is called mode. (true/false)

(20) Mode = 33, Mean = 37 then Median = _____.

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

(1) Define : Set, Equivalent set.

(2) Write down power set of {2, 3}

(3) Define : Mean with example.

(4) If $A=\{x, y\}, B=\{1, 3\}$ find $A\times B$, $B\times A$.

(5) Find Q_2 from the series

17, 8, 5, 3, 14, 6, 10, 21, –2,

(6) Find a point divides the line joining (3, 6) and (6,11) Externally in ratio 2:1.

(b) Any three : **9**

(1) Write properties of complimentary set.

(2) Find area of triangle formed by points

$(x, y-z), (-x, z)$ and $(x, y+z)$.

(3) A = {1, 2, 3, 4, 5, 6, 7, 8, 9}

B = {3, 5, 7}, C = {2, 4, 6}

Verify that $A-(B\cup C)=(A-B)\cap(A-C)$.

(4) The distance between two points (k, 3) and (2, k) is $\sqrt{5}$ find k.

(5) Find Mode :

Class :	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80 – 90	90 – 100
Frequency :	3	5	7	10	12	15	12	6	2	8

(6) Find Missing value when M = 24 :

Class :	0-10	10-20	20-30	30-40	40-50
Frequency :	5	25	?	18	7

(c) Any two : **10**

(1) Write Distributive Law of Intersection over Union and Prove it.

(2) Find Standard Deviation :

x	6	7	8	9	10	11	12
f :	3	6	9	13	8	5	4

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

(4) Show that points (–3, 2), (1, 2), (–3, 5) form a right angle triangle.

(5) Find Median :

x :	18	19	20	21	22	23	24
f :	169	190	200	240	130	100	52

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

(1) Define Square matrix.

(2) Define AP with example.

(3) Define parallel, perpendicular line.

(4) If $A=\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ find A^2.

(5) –12, –8, –4..... Find 11^{th} term of an AP.

(6) Which term will be 124 in
4, 9, 14, 19.....

(b) Any three : **9**

(1) Obtain the sum of first n terms of natural numbers.

(2) 5^{th} term of a GP is 32 and 10^{th} term is 1024. Find 8^{th} term.

(3) If $A=\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ find B, such that $A+2B=A^2$.

(4) If $A=\begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$ $B=\begin{bmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{bmatrix}$ find AB.

(5) Find equation of line joining points (3,5) and (6,4).

(6) In a GP, $T_3 = 18$, $T_6 = -486$ find S_6.

(c) Any two : **10**

(1) Three numbers are in A.P. their sum is 10 and if 1 is added to first number and 4 is added to third number we get a G.P., find numbers.

(2) Five numbers are in A.P. their sum is 35 and product of their first and fifth number is 33, find the numbers.

(3) In AP, $S_6 = 57$ and $S_{10} = 155$ find T_{20}.

(4) If $A=\begin{bmatrix} 1 & -8 & 10 \\ 0 & 2 & -3 \\ 0 & -1 & 2 \end{bmatrix}$ find A^{-1}.

(5) If $A=\begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ prove that adj $A = 3A^T$.