ABA-003-003208   Seat No. _____

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

April / May – 2016

Mathematics & Statistical Foundation of Computer Science

(New Course)

Faculty Code : 003

Subject Code : 003208

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

1   M.C.Q. :   **20**

   (1)   For the series $1+5+9+$.........10th term is ....

      (A)   37

      (B)   38

      (C)   30

      (D)   None

   (2)   If 5, 7, 9,.......... and n^{th} term is 280 then n=..........

      (A)   136

      (B)   121

      (C)   130

      (D)   None

   (3)   If $S_n=3n^2+5n$ then $S_5=$

      (A)   100

      (B)   85

      (C)   990

      (D)   None

(4) If three consecutive terms in A.P. are 2x+7, 6x–2, 8x+4 then X = _____ .

(A) 7.5

(B) 6.5

(C) 7

(D) None

(5) If the sum of three consecutive terms in A.P. is 24 then its second term = ...

(A) 6.5

(B) 6

(C) 8

(D) None

(6) Matrix A with 4×4 order is ....

(A) Row matrix

(B) Rectangle matrix

(C) Square matrix

(D) Column matrix

(7) $(A^t)^t$ = ...

(A) A^t

(B) $(A^t)^{-1}$

(C) A

(D) None

(8) If m = row no. and n = column no. Which of the following conditions is true for a square matrix ?

(A) $m < n$

(B) $m = < n$

(C) $m = n$

(D) $m \neq n$

(9) Matrix A is 2×3 and matrix B is 2×3 then A+B is ....

(A) 3×3

(B) 2×3

(C) 3×2

(D) None

(10) If A={x,y,z} and B={x,y} then which is true ?

    (A) $A \subset B$

    (B) $B \subset A$

    (C) $B \not\subset A$

    (D) None

(11) Which of the following set is Finite ?

    (A) $\{x \,/\, x \in Z\}$

    (B) $\{1, 2, \ldots\ldots\ldots 99, 100\}$

    (C) $\{y \,/\, y \in R\}$

    (D) None

(12) If set A is Set of Odd numbers and B is set of Even numbers then $A \cap B = \ldots\ldots$

    (A) A

    (B) Empty

    (C) B

    (D) None

(13) Singleton set is also known as ....

    (A) Null set

    (B) Finite set

    (C) Equal set

    (D) Unit set

(14) The Mean of the observation 10,–5, 7, 4, 12, 14 is ....

    (A) 6.5

    (B) 6

    (C) 7

    (D) None

(15) If Mean=30 and Median=20 then Mode Z=..........

    (A) 10

    (B) 0

    (C) –10

    (D) None

(16) If n=10, $\sum x = 50$ and $\sum x^2 = 250$, then $S^2 =$..........

(A) 0

(B) 50

(C) 5

(D) None

(17) The Second Quartile is also known as ....

(A) Mean

(B) Standard Deviation

(C) Mode

(D) None

(18) Equation of line having slope 10 and y intercept 20 is........

(A) $y = 20x - 10$

(B) $y = 20x + 10$

(C) $y = 10x$

(D) None

(19) The slope of line passing through the points (1,4) and (3,8) is.........

(A) -2

(B) 3/2

(C) 2/3

(D) None

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

(A) $m_1 = m_2$

(B) $m_1 \neq m_2$

(C) $m_1 \geq m_2$

(D) None

2 (a) Any three : 6

  (1) Define with example (1) Intersection of two sets.

  (2) Define Mean with example.

  (3) If $A = \{4,6,7,2,8\}$ $B = \{2,4,7,9,10\}$ and

    $U = \{1,2,3,4,5,6,7,8,9,10\}$ find $(A \cap B)'$.

  (4) Find Q_2 from the following data : 15,7,16,21,13,18,29,3,20.

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

  (6) If $A = \{x,y\}$ $B = \{1,3\}$ $C = \{3,5\}$

    find (1) $A \times (B \cap C)$ (2) $A \times (B \cup C)$

 (b) Any three : 9

  (1) Define complement of set and write its properties.

  (2) Find K if points (-3,8) (K,5) (-5,2) are collinear.

  (3) Find the distance between two points A(1,-3), B(-2,1)

  (4) If $P = \{x / x \le 9\, x \in N\}, Q = \{y / 2 < y < 8, y \text{ is odd no.}\}$ and

    $R = \{z / 1 < z < 7,\ z \text{ is even no.}\}$ verify that

    $P - (Q \cup R) = (P - Q) \cap (P - R)$.

  (5) Find Mean $(\bar{X})$:

Marks	18	19	20	21	22	23	24
No. of Students	200	250	265	320	400	350	250

  (6) The mean of 200 observations were 50, later it was found that two observations were misread as 92 and 8 instead of 192 and 98, find Correct Mean.

(c) Any two : 　　　　　　　　　　　　　　　　　　　　　　10

(1) For any three sets prove that

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

(2) Find missing frequency when M=24 :

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	25	–	18	7

(3) Find Standard Deviation from the following table :

X	6	7	8	9	10	11	12
F	3	6	9	13	8	5	4

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

(5) Verify that points (2,-1), (3,4), (-2,3), (-3,-2) are the vertices of a rhombus.

3 (a) Any three : 　　　　　　　　　　　　　　　　　　　　　　6

(1) Define with examples : Symmetric Matrix, Diagonal Matrix.

(2) Define : Line, Triangle.

(3) Define : Geometric progression.

(4) If $A = \begin{bmatrix} -5 & 10 \\ 3 & 6 \end{bmatrix}$ $B = \begin{bmatrix} 5 & -3 \\ 2 & -1 \end{bmatrix}$, Find $(A+B)^T$.

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

(6) Find 11th term of –12, –8, –4, ...

(b) Any three : 　　　　　　　　　　　　　　　　　　　　　　9

(1) Obtain the sum of the series : 50, 46, 42,......... upto 20 terms.

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

(3) For an A.P. 8th term is 40 and 11th term is 10, find first term and common difference.

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

(5) If $A+B = \begin{bmatrix} 5 & -5 \\ 12 & 0 \end{bmatrix}$ and $A-B = \begin{bmatrix} -1 & -1 \\ -2 & 8 \end{bmatrix}$ find

Matrix A and B.

(6) Find equation of line passing through points (3,5), (6,4).

(c) Any two :   **10**

(1) Find S_n formula for Arithmetic Progression.

(2) Prove that if unity is added to the sum of n terms of the series 3,5,7,9,.......... it becomes a perfect square.

(3) Three numbers are in A.P. their sum is 30. If 1 is added to first number and 4 is added to last number we get a G.P., find numbers.

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

(5) $B = \begin{pmatrix} 1 & -8 & 10 \\ 0 & 2 & -3 \\ 0 & -1 & 2 \end{pmatrix}$; Find B^{-1}.