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SEMESTER END EXAMINATION NOVEMBER – 2016**B.C.A. / B.Sc. I.T.****16UCADA01 / 16UITDA01 - MATHEMATICS AND STATISTICS - I****Duration of Exam – 3 hrs****Semester – I****Max. Marks – 70****Part A (5x1= 10 marks)**Answer **ALL** questions

- Which of the following set is finite?
 (a) $A = \{x/ x \text{ is odd}, x \in \mathbb{Z}\}$ (b) $B = \{x/ x < 10, x \in \mathbb{Z}\}$
 (c) $C = \{1, 2, \dots, 999, 1000\}$ (d) None
- How many subsets $A = \{100\}$ contain?
- When subtraction of two matrices is possible?
- $A = \begin{bmatrix} 5 & 15 \\ 20 & 15 \end{bmatrix}$ is which type of matrix?
- Define: Onto Function
- $f: A \rightarrow \mathbb{N}$, $A = \{1, 2\}$ $f(x) = x + 10$, find R_f
- Define: Converse of a conditional
- a: Rajkot is a city write $\sim a$
- The value of correlation coefficient lies between _____
- If in rank correlation method $\sum d^2 = 0$ then $r =$ _____

Part B (5X5 = 25 marks)Answer **ALL** questions

- 11a. $A = \{10\}$, $B = \{20, 30\}$, $C = \{10, 30\}$, $D = \{30, 40\}$
 Verify $(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$

OR

- 11b. Define intersection of sets with example & write down properties of intersection.

12a. If $A = \begin{pmatrix} 12 & 1 & 3 \\ 6 & 10 & 5 \\ 4 & 15 & 2 \end{pmatrix}$ find $A + A^T$ and identify the matrix.

OR

12b. $A = \begin{bmatrix} 1 & 3 \\ 10 & 31 \end{bmatrix}$ find AA^{-1} and identify the matrix.

- 13a. Explain briefly with example (1) One – One Function (2) Many – One Function

OR

13b. $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = 2x - 1$, $g: \mathbb{R} \rightarrow \mathbb{R}$, $g(x) = 2x + k$ & $f \circ g = g \circ f$ find k

14a. Explain briefly conjunction .

OR

14b. Write truth table for $(p \rightarrow q) \rightarrow (p \rightarrow r)$

15a. Write properties of correlation coefficient.

OR

Find number of pairs from the following results.

15b. $S_y = 8$, $r = 0.5$, $\sum (x - \bar{x})(y - \bar{y}) = 120$, $\sum (x - \bar{x})^2 = 90$

Part C (5X7 = 35 marks)

Answer **ALL** questions

16a. $A = \{11, 12, 13\}$, $B = \{13, 14\}$ & $C = \{13\}$ verify

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

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

OR

16b. Write Distributive Laws & verify it for the following sets.

$A = \{x/x \in \mathbb{Z}, 0 < x < 6\}$, $B = \{y/y \in \mathbb{N}, y^2 = 9\}$, $C = \{z/z \in \mathbb{N}, 3 \leq z \leq 5\}$

17a. If $A = \begin{pmatrix} 0 & 1 & 2 \\ 2 & -3 & 0 \\ 1 & 1 & -1 \end{pmatrix}$ find $A^3 + 4A^2 - A$ and identify the matrix.

OR

17b. If $A = \begin{pmatrix} 5 & 3 & 1 \\ 2 & -1 & 2 \\ 4 & 1 & 3 \end{pmatrix}$ find $A^3 - 7A^2 - 5A + 13I$ and identify the matrix.

18a. $f(x) = x^2(x+1)^2/4$ find $f(x) - f(x-1)$

OR

18b. $g(x) = x^2(x-1)^2$ find $g(x+1) - g(x)$

19a. Define tautology and verify $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology or not.

OR

19b. Which of the following is logically equivalent ?

(1) $p \rightarrow q \equiv \sim p \vee q$

(2) $p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$

20a. Find regression line y on x from the following information.

X	5	6	7	8	9	10	11
Y	10	12	12	16	16	15	17

OR

20b. Explain scatter diagram method with merits & demerits.