Enroll No.

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)

Affiliated to Saurashtra University, Rajkot

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

<u>Part A</u> (5x1= 10 marks)

Answer ALL questions

1. Which of the following set is finite?

(a) $A = \{x | x \text{ is odd}, x \in Z\}$ (b) $B = \{x | x < 10, x \in Z\}$

(c) $C = \{1, 2, \dots, 999, 1000\}$ (d) None

- 2. How many subsets $A = \{100\}$ contain?
- 3. When subtraction of two matrices is possible?
- 4. $A = \begin{bmatrix} mai \\ n & sul \\ lis \\ 15 \end{bmatrix} \begin{bmatrix} 10^{ibsets} \\ ition \\ 20 \end{bmatrix} \begin{bmatrix} is \\ s \end{bmatrix}$ which type of matrix?
- 5. Define: Onto Function
- 6. f: A N, $A = \{1, 2\}$ f(x) = x + 10, find R_f
- 7. Define: Converse of a conditional
- 8. a: Rajkot is a city write ~a
- 9. The value of correlation coefficient lies between _____
- 10. If in rank correlation method $d^2 = 0$ then r =_____

<u>Part B</u> (5X5 = 25 marks)

Answer <u>ALL</u> 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. $A = \begin{bmatrix} 3 \\ 10 \end{bmatrix} \begin{bmatrix} 1 \\ 31 \end{bmatrix} finc A^{-1}$ and identify the matrix.

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

13b. f: R R,
$$f(x) = 2x - 1$$
, g: R R, $g(x) = 2x + k \& f_0g = g_0f$ find k

14a. Explain briefly conjunction .

OR

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

15a. Write properties of correlation coefficient.

OR

Find number of pairs from the following results.

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

<u>Part C</u> (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. $A = \{x/x \in \mathbb{Z}, 0 < x < 6\}, B = \{y/y \in \mathbb{N}, y^2 = 9\}, C = \{z/z \in \mathbb{N}, 3 | x = 5\}$

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 [$(p \rightarrow q) \land (q \rightarrow r)$] $\rightarrow (p \rightarrow r)$ is a tautology or not.

OR

- 19b. Which of the following is logically equivalent?
 - (1) $p \rightarrow q \equiv \sim p \lor q$
 - (2) $p \lor (q \land r) \equiv (p \lor q) \land (p \lor r)$

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

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

OR

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