



MAU-003-039103

Seat No. _____

B. Voc. (Actech) (Sem. I) (CBCS) Examination

October / November – 2016

Foundation of Speed Mathematics & Statistics

Faculty Code : 003

Subject Code : 039103

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

1 Answer the following : **20**

- (1) Define with example : Infinite set.
- (2) Total numbers of subsets of the set $A = \{1, 2, 3\}$ are _____.
- (3) If A and B have 1 and 3 elements resp. How many elements are there in $A \times B$?
- (4) $A \cap A' =$ _____.
- (5) $A = \{x / x \in N, x \text{ is odd no.}\}$
 $B = \{x / x \in N, x \text{ is even no.}\}$ then $A \cup B =$ _____.
- (6) If $A \subseteq B$ and $B \subseteq A$ then A _____ B.
- (7) How many rows are there in a row matrix ?
- (8) Identify the matrix : $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$.
- (9) If $A = \begin{bmatrix} 61 & 62 \\ 63 & 64 \end{bmatrix}$ then $A^T =$ _____.

(10) If $B = \begin{bmatrix} 7 & 1 \\ 6 & 3 \end{bmatrix}$ then trace of $B =$ _____.

(11) In which type of matrix $A = A^T$?

(12) If $A = \begin{vmatrix} 7 & 5 \\ 1 & 0 \end{vmatrix}$ then $|A| =$ _____.

(13) The equation of line passing through origin and having slope 86 is _____.

(14) Write equation of line having slope 6 and y-intercept = (-3).

(15) The equation of line having intercept 9 on both axes is _____.

(16) Distance between the points (2,0) and (1,3) is _____.

(17) 1's complement of 1110 is _____.

(18) $(29)_{10} = (\text{_____})_2$.

(19) $(111)_2 = (\text{_____})_{10}$.

(20) $(112)_8 = (\text{_____})_{10}$.

2 (a) Any **three** :

6

(1) Write Associative laws for set.

(2) Explain methods of representation of a set.

(3) $A = \begin{bmatrix} 2 & 10 \\ 6 & 1 \end{bmatrix}$ find $A - A'$.

(4) $A = \{66, 67\}$ write power set.

(5) $A = [6 \ 4]$ and $B = \begin{bmatrix} 5 \\ 0 \end{bmatrix}$ find BA if possible.

(6) Define with example :

(a) Scalar matrix

(b) Diagonal matrix.

(b) Any **three** :

9

- (1) Define intersection of sets and write down properties of intersection.
- (2) $A = \{10\}$, $B = \{10, 20\}$, $C = \{10, 30\}$ find $A \times (B \cap C)$ and $A \times (B \cup C)$.
- (3) $A = \begin{bmatrix} 9 & 4 \\ 2 & 1 \end{bmatrix}$ find AA^{-1} and identify the matrix.
- (4) $A = \begin{bmatrix} 9 & 3 \\ 20 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 12 \\ 4 & 5 \end{bmatrix}$ verify $(A+B)^T = A^T + B^T$.
- (5) Distance between $(k, -4)$ and $(-8, 2)$ is 10, find k.
- (6) Find area of $(2, 5)$, $(1, 5)$, $(2, 4)$.

(c) Any **two** :

10

- (1) Prove that $(A \cup B)' = A' \cap B'$.
- (2) $A = \{21, 22, 23\}$, $B = \{23, 24\}$, $C = \{23\}$ verify $A - (B \cap C) = (A - B) \cup (A - C)$.
- (3) If $A = \begin{bmatrix} 1 & 0 \\ -1 & 0 \end{bmatrix}$ find $A^2 - 2A + I$.
- (4) $A = \begin{bmatrix} 3 & 1 \\ 5 & 9 \end{bmatrix}$ $B = \begin{bmatrix} 11 & 4 \\ 6 & 2 \end{bmatrix}$ verify $(AB)' = B' A'$.
- (5) Verify that $(3, 2)$, $(5, 4)$, $(3, 6)$, $(1, 4)$ are the vertices of a square.

- 3 (a) Answer any **three** : 6
- (1) Define : Parallel lines.
 - (2) Write equation of line passing through two points.
 - (3) Find ratio in which (5,12) and (2,9) is divided by (3,10).
 - (4) Convert Decimal to Binary.
 - (i) 101
 - (ii) 108
 - (5) Convert Hexadecimal to Decimal
 - (i) 5D
 - (ii) 3C9
 - (6) Explain : Medatation.
- (b) Any **three** : 9
- (1) Explain :
 - (i) Decimal number system
 - (ii) Octal number system.
 - (2) Convert Octal to Decimal.
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 - (3) Find equation of line passing through (5,3) and having slope $\frac{2}{3}$.
 - (4) Find 1's complement and 2's complement of 11011.
 - (5) Explain : Observation.
 - (6) Explain : Self confidence.
- (c) Any **two** : 10
- (1) Explain in brief skills to improve memory.
 - (2) Explain : Concentration.
 - (3) Subtract by 2's complement method $(0101)_2 - (1100)_2$.
 - (4) Convert Binary to Octal
 - (a) $(1101010)_2 = (\text{_____})_8$.
 - (5) Verify $2x - 5y + 8 = 0$ and $4x - 10y + 5 = 0$ are parallel lines.