

Roll No.

Total No. of Pages : 02

Total No. of Questions : 07

BCA (Sem.-1st)
MATHEMATICS (BRIDGE COURSE)
Subject Code :BC-102
Paper ID : [B0202]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY.
2. Attempt any FOUR questions from SECTION-B.

SECTION-A (10 × 2 = 20 Marks)

1. Write short notes on :

- (a) Define mean and median
- (b) Explain relation & function
- (c) Explain Idempotent laws
- (d) What do you mean by Disjoint sets?
- (e) Explain properties of Determinants.
- (f) What do you mean by Union & intersection of sets?
- (g) Explain De-Morgan's law.
- (h) What do you mean by cofactors of the determinant?
- (i) Define Greatest integer function.
- (j) Find the value of x & y when

$$\begin{vmatrix} 9 & 5 \\ y & x \end{vmatrix} = 1 \quad \& \quad \begin{vmatrix} 8 & 7 \\ y & x \end{vmatrix} = 3$$

SECTION-B (4 × 10 = 40 Marks)

2. (a) Find the transpose and adjoint of the matrix A, where A =

$$A = \begin{vmatrix} 5 & 2 & 8 \\ 0 & 5 & 0 \\ 7 & 4 & 5 \end{vmatrix}$$

- (b) Find the coefficients of x in the expansion of $(1 - 2x^3 + 3x^2)(1 + 1/x)^8$
(5,5)

3. Find $(x + 1)^6 + (x - 1)^6$. Hence; evaluate $(\sqrt{3} + 1)^6 + (\sqrt{3} - 1)^6$ (5,5)

4. (a) Prove by the principle of Mathematical induction that for all $n \in \mathbb{N}$

$$1+4+7+ \dots (3n - 2) = \frac{1}{2}[n (3n - 1)]$$

(b) Prove that by the principle of Mathematical induction that for all $n \in \mathbb{N}$, 3^{2n} when divided by 8, the remainder is always 1. (5,5)

5. Find the mean, median and mode of the following data relating to weight of 120 articles.

Weight in gm	0-10	10-20	20-30	30-40	40-50	50-60
No. of articles	14	17	22	26	23	18

(10)

6. What do you mean by function, kind of functions and relation. For the relation R_1 defined on \mathbb{R} by the rule $(a, b) \in R_1 \iff 1 + ab > 0$. Prove that $(a, b) \in R_1$ & $(b, c) \in R_1 \Rightarrow (a, c) \in R_1$ is not true for all $a, b, c \in \mathbb{R}$. (10)

7. (a) Prove that

$$\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} = 1 + a^2 + b^2 + c^2$$

(b) The coefficients of three consecutive terms in the expansion of $(1 + x)^n$, are in the ratio 1:7:42, find n . (5,5)