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)**

l. 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

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

SECTION-B   **(4 × 10 = 40 Marks)**

2. (a) Find the transpose and adjoint of the matrix A, where A = $\begin{vmatrix} 5 & 2 & 8 \\ 0 & 5 & 0 \\ 7 & 4 & 5 \end{vmatrix}$

(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 $n\ \varepsilon\ N$

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

   (b) Prove that by the principle of Mathematical induction that for all $n \in N$, 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 R by the rule $(a, b)\ \varepsilon\ R_1 \iff 1 + ab > 0$. Prove that $(a, b)\ \varepsilon\ R_1\ \&\ (b, c)\ \varepsilon\ R_1 \Rightarrow (a, c)\ \varepsilon\ R_1$ is not true for all $a, b, c\ \varepsilon\ R$.   (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)