**Roll No.** **Total No. of Pages : 02**

**Total No. of Questions : 07**

**B.Sc. (IT) (Sem.–1st)**

# BASIC MATHEMATICS-I

**Subject Code : BS-103**

**Paper ID : [B0402]**

**Time : 3 Hrs.** **Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students has to attempt any FOUR questions.**

## SECTION-A

**1. Write briefly :**

(a) Prove that $A \cap U = A$.

(b) Define power set with an example.

(c) Find the value of $\sin \frac{31\pi}{3}$.

(d) If $A = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$, and $B = \begin{bmatrix} 1 & 4 \\ 7 & 2 \end{bmatrix}$. Find $3A - 2B$.

(e) Find the $n^{th}$ term of the sequence

$5, \ 2, -1, -4, -7, \ldots.$

(f) Define median. Give formula to compute median in continuous series.

(g) Evaluate ${}^{10}C_1 + {}^{10}C_2 + {}^{10}C_3 + \ldots. + {}^{10}C_{10}$.

(h) Define minors and Co-factors of determinant.

(i) The following table gives the marks obtained by B. Com. Students with Roll. No. 1 to 10. Obtain average marks of the students.

| **Roll No.** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Marks** | 43 | 48 | 65 | 57 | 31 | 60 | 37 | 48 | 78 | 59 |

(j) Explain the relationship between A.M. and G.M.

## SECTION-B

2. What is Frequency distribution table? Explain the various kinds of class intervals in which data can be arranged in a Frequency distribution. (10)

3. If the $p^{th}$, $q^{th}$, $r^{th}$ terms of a G.P. are $x$, $y$, $z$ respectively. Prove that

$$x^{q-r} \cdot y^{r-p} \cdot z^{p-q} = 1. \quad (10)$$

4. Show that



$$\begin{vmatrix} a & b-c & c+b \\ a+c & b & c-a \\ a-b & b+a & c \end{vmatrix} = (a+b+c)(a^2+b^2+c^2) \quad (10)$$

5. If A, B and C are three sets, then prove that

$$A \cap (B - C) = (A \cap B) - (A \cap C). \quad (10)$$

6. Find the coefficient of $x^{-2}$ in $\left(3x - \frac{7}{8}\right)^8$. (10)

7. For two matrices A and B, $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 5 & 0 \end{bmatrix}$, verify that

$$(AB)^T = B^T \cdot A^T. \quad (10)$$