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

Total No. of Questions : 07

BCA(2009 to 2010 Batch) (Sem.–1)

MATHEMATICS (BRIDGE COURSE)

Subject Code : BC-102

Paper ID : [B0202]

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.**
3. **Use of Non-Programmable Scientific calculator is allowed.**

SECTION-A

l. Write short notes on :

(a) Write the set A = {5, 10, 15, 20, 25} in the set builder form.

(b) If A = {1, 2, 3}, B = {4, 5}, then show that $A \times B \neq B \times A$.

(c) If X and Y are any two non-empty sets determine $X \cap (X^C \cap Y^C)$ where X^C, Y^C are complements of X and Y respectively.

(d) Define a Radian.

(e) If $R \cos \theta = \sqrt{3}$ and $R \sin \theta = 1$, find R and θ.

(f) Find the number of terms in the Binomial expansion of the expression $(1 + 2x + x^2)^{20}$.

(g) Find x, y, z and w if

$$3\begin{bmatrix} x & y \\ z & w \end{bmatrix} = \begin{bmatrix} x & 6 \\ -1 & 2w \end{bmatrix} + \begin{bmatrix} 4 & x+y \\ z+w & 3 \end{bmatrix}$$

(h) Define a skew-symmetric matrix.

(i) Find the mean of the following distribution :

Marks (X) :	20	21	22	23	24	25	26
Frequency (Y) :	1	2	4	7	5	3	1

(j) Marks obtained by students awarded out of 100 are as follows : Form a frequency table with class interval 10.

15, 22, 37, 37, 40, 42, 50, 51, 56, 60, 61, 63, 70, 75, 78, 81, 90

SECTION-B

2. Prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$ for any three sets.

3. Draw a Venn diagram of the sets A, B and C where

   (a) A and C are dijoint but $A \subseteq B$, $B \cap C \neq \phi$

   (b) Where $A \subseteq B$, $B \cap C \neq \phi$ but $A^C \cap C^C \neq \phi$, $A \cap C \neq \phi$

4. Prove that :

$$\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$$

5. Find the term independent of x in the expansion of $\left(2x + \frac{1}{x}\right)^{10}$ by Binomial Theorem.

6. If $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{bmatrix}$

   from the products AB and BA and show that $AB \neq BA$.

7. The numbers 3, 6, 8 and 5 have frequencies x, $(x+2)$, $(x-3)$ and $(x+6)$ respectively. If the arithmetic mean is 5, find the value of x.