

Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 09

**BMCI (2013 Batch) (Sem.-1)**  
**MATHEMATICS – I (Bridge Course)**  
Subject Code : BMCI-101  
Paper ID : [G1111]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A****Q1 Answer briefly :**

- (i) Define Union of two Sets and give one example.
- (ii) Define Duality.
- (iii) Define Arithmetic mean.
- (iv) State Binomial theorem.
- (v) What is a statistical problem?
- (vi) Write all the partitions of  $\{1, 2, 3\}$ .
- (vii) Find the determinant of  $\begin{bmatrix} -3 & -1 \\ 5 & 0 \end{bmatrix}$
- (viii) Define the use of statistics.
- (ix) Define upper triangular matrix.
- (x) Define Square matrix.

### SECTION-B

- Q2 Find the minors and cofactors of  $A = \begin{bmatrix} -1 & 1 & 3 \\ 1 & -3 & 3 \\ -2 & -4 & -4 \end{bmatrix}$
- Q3 What is the fourth term in the expansion of  $(3x - 2)^{10}$ ?
- Q4 Use Mathematical induction to show that  $1.2 + 2.3 + \dots + n(n+1) = \frac{n(n+1)(n+2)}{3}$
- Q5 State and prove De Morgan's law.
- Q6 An airplane flies along the four sides of a square at speeds of 100, 200, 300 and 400 km/hr. What is the average speed of the plane in its flight around the square?

### SECTION-C

- Q7 There are exactly three types of students in a school: the hockey players, the football players, and the athletes. Each student is classified into at least one of these categories. And the total number of students in the school is 1000. Suppose that the following is given: The total number of students who are the hockey players is 310. The total number of students who are the football players is 650. The total number of students who are athletes is 440. The total number of students who are both the hockey players and the football players is 170. The total number of students who are both the hockey players and athletes is 150. The total number of students who are both the football players and athletes is 180. What is the total number of students who fit into all 3 categories and the number of students who are only athletes?

- Q8 Evaluate by using the properties of determinant :  $\begin{bmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{bmatrix}$

- Q9 Calculate median and mode of the following :

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