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

Total No. of Questions : 07

### B.Sc. (IT) (2013 & 2014)  (Sem.–1)
## BASIC MATHEMATICS – I
### Subject Code : BS-103
### M.Code : 12502

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 SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

## SECTION-A

1. Write briefly :

   a) Define Equality of two sets.

   b) Define Partitioning of a set.

   c) Find the $4^{th}$ term in the expansion of $(x - 2y)^{12}$

   d) Compute $(99)^5$ by using Binomial.

   e) Define Invertible Matrix.

   f) Find the determinant of $\begin{bmatrix} 1 & 4 \\ -3 & -5 \end{bmatrix}$.

   g) Define Mean.

   h) Define Mode.

   i) Find the $20^{th}$ term of the A.P. given by 21, 16, 11, 6, 1, –4, –9, ……

   j) Find two Geometric Mean between 3 and 81.

## SECTION-B

2. a) State and Prove De-Morgan's law.

   b) Prove that $\dfrac{\cos\phi}{1-\tan\phi} + \dfrac{\sin\phi}{1-\cos\phi} = \sin\phi + \cos\phi$.

3. 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?

4. Find the inverse of the matrix : $\begin{vmatrix} 4 & -6 & 1 \\ -1 & -1 & 1 \\ -4 & 11 & -1 \end{vmatrix}$.

5. Evaluate without expansion : $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}$

6. Find the missing frequency from the following data when the arithmetic mean is 34 marks and then find the median.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| No. of Students | 5 | 15 | 20 | – – – | 20 | 10 |

7. a) Find the three number in A.P. whose sum is 21 and product is 315.

   b) Find three numbers in G.P. whose sum is 19 and sum of their squares is 133.