

**BCA (Honours) 1<sup>ST</sup> Semester Examination, 2019**

**Subject: Computer Application**

**Paper: BCA – 103 (Mathematics-I)**

**Time: 2 Hours**

**Full Marks: 40**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**Group A**

Answer any **four** questions:

5 × 4 = 20

1. Write down the definition of group, ring and field.
2. Discuss on the operations of set theory.
3. Find all those values of  $z$  which satisfy  $z^4 + 1 = 0$ . Write the values in standard Cartesian form.
4. Determine the number of positive and negative real zeros for the given function  
 $f(x) = x^5 + 4x^4 - 3x^2 + x - 6$ .
5. Find  $A^{-1}$  where  $A = \begin{pmatrix} 3 & 0 & 2 \\ 2 & 0 & -2 \\ 0 & 1 & 1 \end{pmatrix}$ .
6. What do you mean by scalar and vector product? Find the area of parallelogram defined by co-ordinates (0,0,0), (1,3,4) and (2,1,3) using vector product.

**Group B**

Answer any **two** questions:

10 × 2 = 20

1. Discuss the nature of the conic  $4x^2 - 4xy + y^2 + 2x - 26y + 9 = 0$  and find the equation of axis, tangent at the vertex and the length of the latus rectum.
2. Discuss on Cardon's formula to solve cubic equation.
3. Solve the system of equations using Cramer's rule:  $2x + y + z = 3$ ,  $x - y - z = 0$ ,  
 $x + 2y + z = 0$ .
4. Find the angle by which the axes should be rotated so that the equation  
 $ax^2 + 2hxy + by^2 = 0$  becomes another equation in which the term  $xy$  is absent. In particular, find the angle through which the axes are to be rotated so that the equation  
 $17x^2 + 18xy - 7y^2 = 1$  may be reduced to the form  $Ax^2 + By^2 = 1$ ,  $A > 0$ ; find also  $A$  &  $B$ .