Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao-Goa
FY BCA Semester-I, Supplementary Examination June 2023
Basic Mathematics (CAC-103)

**Duration: 2 Hours** **Max Marks: 60**

*Instructions: 1) Figures to the right indicate Full Marks.*
*2) All Questions are compulsory.*
*3)Use of non programmeable calculator is allowed.*

**Q.1A.State whether the following statements are true or false.** **(5x1= 05 marks)**

a) The gcd of 25 and 225 is 25 .
b) Characteristic of 245.5 is -2 .
c) 5 is a complex number and also a natural number.
d) $90^{\circ}$ is equal to $\frac{\pi}{2}$ radians.
e) If $\vec{a}.\vec{b} = 0$ then the two vectors $\vec{a}$ and $\vec{b}$ are perpendicular to each other.

**Q.1B. Answer the following questions.** **(5x1= 05 marks)**

a) Convert 270 degrees to radians.
b) Write the prime factorisation of 666.
c) Simplify $\log_3 2 \times \log_2 3$ .
d) Find the reciprocal of a complex number 2 + i as a complex number.
e) Find the slope and y-intercept of the line $2x + 4y + 7 = 0$.

**Q.2. Answer the following.** **10 marks**

a) Write the nature of roots of the quadratic equation $x^2 - 4x + 4$. **(2)**
b) Solve for y in the expression $\log_{10} y + \log_{10}(y - 3) = 1$. **(3)**
c) The diameter of a cone is 14m and its slant height is 9m. (Take $\pi = \frac{22}{7}$ ) Find
i)Curved surface area of cone
ii)Volume of cone **(5)**

**Q.3. Answer the following** **10 marks**

a) Find which term of the A.P. 3,8,13 …is 78 . **(2)**
b) The ratio of income in two consecutive years is 2: 3 respectively. The ratio of their expenditure is 5: 9. Income of second-year is Rs 45000 and Expenditure of first-year is Rs 25000. Find the Savings in both years together. **(3)**

c) Solve using cramer's rule $5x + 3y = 17$ , $3x + 7y = 31$ . (5)

**Q.4. Answer the following.** **10 marks**

a) Find whether the two vectors $\vec{a} = 10\,i + 10\,j + 2\,k$ and $\vec{b} = 2\,i - 3\,j + 5\,k$ are perpendicular to each other. (2)

b) Express $\frac{20-4\,i}{3+2i}$ in the form a + bi (3)

c) Write the equation of circle having centre (2, -1) and which passes through (3 , 6) . Find also the coordinates of the points in which the circle cuts the x-axis. (5)

**Q.5. Answer the following.** **10 marks**

a) If $\vec{a} = 3\hat{\imath} - 3\hat{\jmath} + \hat{k}$ and $\vec{b} = 4\,\hat{\imath} + 9\hat{\jmath} + 2\,\hat{k}$ find $\vec{a} \times \vec{b}$ . (2)

b) Find the product of complex numbers $(-3 - 7i)$ and $(-5 + 8i)$. (3)

c) Give an example of a 3 x 3 Scalar matrix.Find the values of x and y which satisfy the relation $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} + 2 \begin{bmatrix} -2x \\ -y \end{bmatrix} = \begin{bmatrix} -5 \\ 8 \end{bmatrix}$ (5)

**Q.6. Answer the following.** **10 marks**

a) Show that Sec A(1-sin A)(Sec A + tan A) = 1 . (2)

b) Find which term of the A.P. 3, 15, 27, 39 … will be 132 more than its $54^{th}$ term. (3)

c) Determine the value of constant a so that the given function is continuous

$$F(x) = ax + 5 \quad \text{if} \quad x \leq 2$$
$$= x - 1 \quad \text{if} \quad x > 2$$

If $g(x) = x^2 - 3$ then find g(g(g(x)). (5)